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POLICIES FOR INDUSTRIAL GROWTH IN A COMPETITIVE WORLD

A VOLUME OF ESSAYS

PREPARED FOR THE USE OF THE

SUBCOMMITTEE ON ECONOMIC GOALS AND INTERGOVERNMENTAL POLICY

OF THE

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APRIL 27, 1984

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LETTERS OF TRANSMITTAL

APRIL 25, 1984.

Hon. ROGER W. JEPSEN,
Chairman, Joint Economic Committee,
Congress of the United States, Washington, D.C.

DEAR MR. CHAIRMAN: I transmit herewith a volume of essays entitled "Policies for Industrial Growth in a Competitive World." This volume was prepared for the Subcommittee on Economic Goals and Intergovernmental Policy under the auspices of the Overseas Development Council. It represents a unique collaborative effort between the Subcommittee and that organization, which has produced an important contribution to a growing national debate.

The volume covers the major practical issues of policies to promote industrial competitiveness—issues which must be faced whether the United States eventually adopts a formal "industrial policy" or not. These issues are: investment policy, technology policy, trade policy, labor market policy and antitrust policy. Each receives treatment here in a separate, wide-ranging, dispassionate essay. The essays draw on the unique international perspective of scholars associated with the Overseas Development Council, and provide readers with a valuable source of comparative information on the industrial competitiveness efforts of our major allies and trading partners.

The essays were edited by Richard Newfarmer, formerly of the Overseas Development Council and now with the World Bank. The Subcommittee is grateful to Dr. Newfarmer, his colleagues and associates at the ODC, and to the contributing authors—Kenneth Flamm, Lee Price, Michael Podgursky, and David Martin—for their work in developing a superior and timely volume of papers.

Editing of these papers was carried out in close association with the Subcommittee, under the supervision of James K. Galbraith, Deputy Director of the Joint Economic Committee, who has also contributed a foreword. Comments on particular essays were prepared by Richard Kaufman, Bill Buechner, George Tyler, Mary Eccles, and Sandra Masur, of the Committee staff. The views expressed are solely those of the authors, and do not necessarily represent the views of the Overseas Development Council, the World Bank, any institutions with which individual authors may be affiliated, or the Joint Economic Committee or its Members.

Sincerely,

LEE H. HAMILTON,
Chairman, Subcommittee on Economic Goals
and Intergovernmental Policy.

APRIL 19, 1984.

Hon. LEE H. HAMILTON,
Chairman, Subcommittee, on Economic Goals and Intergovernmental Policy, Joint Economic Committee, Congress of the United States, Washington, D.C.

DEAR MR. CHAIRMAN: This project originated under the auspices of the Overseas Development Council. It has been prepared for the Joint Economic Committee under the able editorship of Richard Newfarmer, formerly of the ODC and now with the World Bank.

The Council's interest in industrial policy stems from the fact that the distinction between U.S. domestic and foreign policy interests has become increasingly blurred. The way in which the United States responds to its domestic economic problems spills over into international markets, and strongly affects developing countries, their prospects for growth, and U.S. national interests in Third World development. The ODC thus felt it would be useful to address what are at first blush primarily domestic concerns, but with strong implications for the rest of the world.

Many people have helped with these papers. John Sewell, President of the ODC, has been especially supportive. He, together with John Lewis, the Director of Studies at ODC and Professor of Economics at Princeton, provided much useful guidance. In addition, several people have provided extensive comments and encouragement: Michael Aho, Douglas Bennet, Douglas Bennett, Michael Boretsky, William Diebold, Richard Feinberg, John Jackson, Williad Mueller, Leonard Rapping, Daniel Sharp, Kenneth Sharpe, Andrew Wechsler, and Leonard Woodcock.

Special thanks go to Kathy Lynn of the ODC who efficiently and expeditiously handled much of the administrative burden of the project and copy edited the final manuscript.

Sincerely,

JAMES K. GALBRAITH,
Deputy Director, Joint Economic Committee.

FOREWORD

By James K. Galbraith
Deputy Director, Joint Economic Committee

Not too long ago, the concept of industrial policy was obscure, its advocates few in number, their views peripheral to the main currents of economics. Today, industrial policy is at the center of a spirited national debate. Its advocates have captured the imagination of many political leaders, of influential constituencies among both business and labor, and of the press. Its opponents have been obliged to take a forceful, clearly articulated position in defense of what were once the accepted verities: the optimality of marketplace solutions to allocative problems, the sufficiency of good macroeconomic policy for the achievement of macroeconomic ends.

It is not difficult to understand the origins of this debate. Mainstream macroeconomic management deserves its poor reputation. It has failed to conquer inflation, even temporarily, except at an intolerable cost in joblessness and lost production. It has failed to mitigate the costs of adjustment of our industrial structure to new technologies and the emergence of developed industries in other parts of the world. Yet the traditional measures of intervention—including incomes policies as conventionally conceived—have also proved unsustainable in the face of widespread political opposition to their implementation and doubts about whether their benefits outweigh their costs. So, industrial policy has emerged as an alternative: a policy approach concerned with the structure of industry, with the "supply side", which offers some hope of meeting the diverse needs—for competitiveness, for adjustment, for employment opportunities, for productivity gains—that seemed to be imposed on us by changing competitive conditions around the world.

Viewed dispassionately, most industrial policy platforms do not represent a fundamental departure from the past. Rather, they attempt to identify past experiences of successful industrial development policy—such as some believe the Reconstruction Finance Corporation to have been—and to combine the revival of such efforts with action on issues which have been continually on the public agenda for many years: trade policy, technology development policy, labor market adjustment policy, capital formation policy, and antitrust. The appeal of industrial policy to its supporters—and the source of apprehension felt by opponents—lies in the promise of coherence and political force that might be brought to the entire menu of such policies by a common conception of their goals.

In defining those goals, advocates of industrial policy point to the experience of other countries, developed and developing, who have articulated industrial development policies. There was a great flowering of such policies in the nineteen-seventies, in response to

the transformed patterns of demand wrought by OPEC, the oil shocks, and the more general loss of dynamism in Western economies by comparison with East Asia and parts of the developing world. In some cases, the goals of industrial policies which seemed appropriate for, say, Japan in the sixties or Brazil in the seventies, were based on a perceived need to emulate successes of still earlier industrial development in the United States. These may not be appropriate for the United States itself as we face, not any need to recreate our own past, but an unknown and uncertain future. In other cases, such as West Germany and France in the seventies, the goals of industrial policy may have been unduly oriented to what were then rapidly growing export markets, such as in Latin America, whose medium-term future is now under a cloud. These would also not be good models for the present-day United States. Still, advocates of industrial policy maintain that lessons can be drawn from the experience of other nations, and it would be philistine, not to say chauvinist, to ignore those lessons if their true message can be divined.

Given these two great sources of the industrial policy debate—our own past and present interventionist agenda and the experience of foreign countries—a compelling need remains for reliable, dispassionate information about both. There is no shortage of selective analyses in which information is presented in support of one position or another. The unmet demand is, instead, for a wide-ranging, readable survey of the major issues encompassed and subsumed by today's industrial policy debate.

This volume of essays will help meet this demand. A review of the contents will show its exceptional range; a reading of each essay will show the clarity and professionalism with which each has been prepared.

Investment Policy, in the United States and overseas, is the subject of the first chapter, which is authored by Richard Newfarmer. Newfarmer finds that existing U.S. investment policies revolve around subsidies and tax expenditures designed to achieve goals other than international competitiveness—such as increased owner-occupied housing, national defense, and environmental protection. I believe readers will find Newfarmer's summaries of the conduct of investment policies overseas to be a valuable source of information and references, and his analysis of their importance (or lack of it) to U.S. interests, incisive.

Technology Policy is the topic of Kenneth Flamm's fine essay in Chapter Two. Flamm points out what is at the same time well-known and oft-forgotten—that this area has been historically one of U.S. pre-eminence, only recently challenged by foreign efforts largely modeled in our own. Such policy, Flamm points out, is formulated largely at the Department of Defense, and oriented to its national objectives; in some instances this works against national goals. It is also an area on which there is a vast amount of extant economic research, from which—a rare thing in economics—sensible conclusions about policy priorities can readily be drawn.

Trade Issues are covered by Lee Price in Chapter Three. First, Price reviews the rationales which have been advanced for incorporating a program of limited trade intervention into an industrial policy. Then, he summarizes the actual past roles of U.S. trade policy, in the GATT and in domestic policy response to the trade

and intervention policies of our trading partners. Price's argument links the justifications for further U.S. intervention provided in the first part of his paper to the actual policy described in the second and outlines the further evolution of U.S. trade policy that would flow from acceptance of his premises. His conclusion is that there is a fundamental need for trade policy alternatives that do not force workers into a crude choice between raw adjustment without assistance, and raw protection without adjustment.

Labor Market Adjustment Policy is covered by Michael Podgursky's essay in Chapter Four. Podgursky provides a thorough review of the various needs which have led to the present complicated structure of policies. He shows how U.S. expenditures on its unemployed have gone down at precisely the time when labor adjustment measures are most needed. His historical summary and international comparisons provide a stark reminder of the deficiencies of U.S. practice in this area, and he provides a specific list of feasible reforms.

Antitrust Policy is the fifth chapter, by David Dale Martin. Martin provides a counter to those who would view industrial policy as a means to effect a retreat from competition and to abandon the protections afforded consumers and entrepreneurs by the existing framework of anti-trust. His essay makes a case which American advocates of the free market should find congenial: that our success has been based in the past on a competitive spirit fundamentally superior to that of our competitor nations, who have been forced to engage the cartelizing energies of government so as to marshall forces to overtake our lead.

These are essays with a point of view. In each case, the authors have taken the interventionist position, and sought to portray that position in a favorable light. What distinguishes these essays, however, is the breadth of analytical vision, the balanced judgment, and the reasoned clarity with which each case is put.

I believe that advocates of industrial policy will find much here to help define and specify their case. At the same time, opponents of the more extreme claims for industrial policy will find much that supports their call for a reasonable, limited, incremental approach, taken in the context of sensible macroeconomic policies, active development policies, and efforts to sustain a free and open trading system and the international financial order.

CONTENTS

	Page
Letters of Transmittal	III
Foreword—James K. Galbraith	V
I. Investment Policy—Richard Newfarmer	1
Are investment policies important?	3
Foreign industrial policies: An international comparison	4
The Federal Republic of Germany	5
The United Kingdom	5
France	6
Japan	7
The United States	7
The role of developing countries	9
Brazil	9
Mexico	10
South Korea	11
Levels, forms, and trends of investment policies compared	12
Aggregate subsidies and taxation	12
Industrial targeting	15
Summary patterns	16
Conclusions and policy implications	17
References	21
II. Technology Policy in International Perspective—Kenneth Flamm	23
Introduction	23
The limitations of the market	25
Some qualifications	26
Other problems in high technology activities	27
A historical perspective	28
An international perspective	34
Technology and industrial policy in the United States	35
Technology policy in Europe	39
Japanese technology development	41
Technology policy in the Third World	42
Some lessons of historical experience	44
Toward a rational technology policy	45
The international dimension	47
References	50
III. Trade Issues in U.S. Industrial Policy—Lee Price	52
Overview	52
The historical backdrop	52
Sources of trade instability	55
Exchange rates and volatile capital flows	55
Oil prices	58
Wage-based competition	58
Changing Government-business relations	58
Transnational enterprises	59
Implications for macroeconomic policy, income distribution and employment	60
The foundations of U.S. trade policy	61

III. Trade Issues in U.S. Industrial Policy—Lee Price—Continued
Page
The United States in the GATT: Proponent of limited government 62
The United States at home: Defender against foreign governments 64
Toward a comprehensive trade policy: The opportunity provided by the Safeguards Code 65
Conclusion 68
References 69
IV. Labor Market Policy and Structural Adjustment—Michael Podgursky 71
The changing structure of employment 71
The decline of industry 71
Regional imbalances 74
Rising structural unemployment 75
International trade and labor displacement 76
Active labor market policy 77
Training and adjustment 78
U.S. policy since 1962 79
Active retraining policy abroad 81
The Public Employment Office 83
The shifting mandate of the U.S. Employment Service 84
The employment service abroad 85
Income maintenance and adjustment 86
The rise and fall of trade adjustment assistance 87
Conclusions and policy recommendations 91
General policy recommendations 91
Some specific recommendations 92
References 94
V. The Role of Antitrust in the Industrial Policies of the United States—David Dale Martin 97
International competition and new arguments to abandon antitrust 98
Reconsidering the Industrial Policy—Antitrust Interface 103
Jurisdictional limitations 103
Governmental restraints on competition 105
Possible changes in U.S. antitrust policy 106
The Export Trading Company Act 107
Joint ventures in research and development 109
Harmonization and coordination 110
Conclusions 111
Appendix 111

I. INVESTMENT POLICY

By Richard Newfarmer*
World Bank

As the international economy has faltered and the U.S. position relative to other advanced countries has declined, concern for America's competitive position has widened. Public attention has gone beyond traditional trade measures to extend to the process of capital and technology formation itself. The 1980 Presidential campaign brought forth so-called "supply side" measures to increase the rate of investment and capital formation to halt the slide in productivity growth. More recent debate has focused on investment in particular industries, notably steel and autos, as well as high-technology industries.

To be sure, there is considerable dispute over U.S. competitiveness. The recently released "Economic Report of the President" (1983:53) states "The overall performance of the United States . . . does not suggest a long-term problem of competitiveness." Rather, the administration asserts that "the United States has not experienced a persistent loss of ability to sell its products on international markets . . ." (1983:52). It cites statistics for 1973 and 1980 comparing the United States with other OECD countries' rates of growth in GDP, relative export shares, and employment to buttress its case. Changes in the U.S. competitive position "are more the result of changes in U.S. saving and investment position than of slow productivity growth" (1983:53). Nonetheless, critics argue the policies associated with "Reaganomics"—large tax cuts, high deficit spending, tight monetary policy, and redistribution of the tax burden toward the low-income groups—did not ameliorate the deep recession of 1979–83 nor stem the tide of increasing unemployment. These policies have overlooked long-term changes in the sectoral composition of production and trade.

While most proponents of industrial policy underscore the need "to get macroeconomic policies right", they emphasize that this alone will be insufficient to cope with the "pervasive problems posed by structural adjustment" (Diebold, 1982; Pinder, 1982). William Diebold writes: "The new realism emphasizes not only the need to supplement macroeconomic policy . . . but also the suspicion that one of the reasons for the lack of success of the more general economic policies is that there is some accumulation of structural difficulties . . ." (1982:193).

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*The author wishes to thank Kathy Lynn for her editorial and administrative help and Robert Pillar for his thorough and conscientious research assistance. This was written while the author was a Senior Fellow at the Overseas Development Council; does not reflect views here in the official position of either the Council or the World Bank.

Several writers advocate new measures to channel investment into industry to promote American competitiveness. Felix Rohatyn (1981) has called for a Reconstruction Finance Corporation which would provide cheap capital for the rebuilding of selected American industries. Business Week (1980) and Lester Thurow (1980) advocate a national development bank that would funnel subsidized credit to promote new high-technology industries, but not to "sunset" industries. Ronald Muller (1980) has advocated and advisory investment board that would suggest industrial priorities and a development bank that would provide access to cheap capital to promote their development. Gar Alperovitz (1981) has called for a "committed public investment strategy." All of these proposals seek to change the current incentive structure facing businessmen through capital markets. Almost all contain an implicit or explicit subsidy or subsidy-cum-regulation. Magaziner and Reich (1982) present a variation of this idea by arguing that the United States already subsidizes selected industries, but that the current pattern of subsidies ought to be reordered to promote more rapid industrial growth. Since the U.S. economy is embedded in a larger international economy, these changes are designed to influence the rate and location of new investment relative to other nations, relative productivity growth, and thus U.S. international competitiveness.

There are several reasons for the public sector to control or stimulate investment in a particular industry. Industries may be necessary for national defense. Plant closings may hit one region with particular severity, an example of when the real social costs of private transactions are much higher than the costs to particular firms. Or capital markets may be imperfect—oversupplying funds to large established firms while undersupplying venture capital to new firms; or financial markets may perceive some projects as too risky because of large size or with pay-offs too far in the future, such as nuclear power, agricultural technology, or investments in technology generally. Or product markets may be imperfect, allowing foreign firms to exploit their market power in ways not open to their American competitors. In each one of these cases, the decision to override market signals is fundamentally a political one because policymakers believe that the verdict of the market is inconsistent with social goals.

However compelling the above reasons may be for special policies toward a particular industry, this paper treats another reason frequently given for an activist U.S. investment policy: the activist industrial policies of other governments. One approach to this question would be to analyze in comparative fashion the macroeconomic determinants of investment, particularly rates of savings and growth. While acknowledging the fundamental importance of macroeconomic policy, this paper instead focuses on specific investment policies which affect an industry's long-term competitive position—capital allocation, industrial targeting, subsidies to technology development, tax expenditures for capital and technology, and, to a lesser extent, performance requirements. These investment policies are discussed in three ways. An opening section charts the interplay between industrial policies, changes in the international economy, and the GATT. A second part briefly compares the policies of selected OECD countries and developing countries to discern

purpose, trends and extent of interventions, and their consequences for international competitiveness. The concluding section discusses possible U.S. responses along with some detailed exploration of the implications of alternative programs for the developing countries.

Two debates are found woven into this discussion of investment policy: Should the United States insist that other countries abandon their investment policies in favor of circumscribed government intervention or should the United States adopt its own industrial policies in response to those abroad? And, what should be the balance between resources devoted to preserving existing domestic industry and those devoted to accelerating the process of developing new industries?

Are Investment Policies Important?

For a range of new industries, the global location of comparative advantage is not tied to particular resource or location-specific endowments, but primarily based upon capital and technology (see Zysman, 1982). For these products, comparative advantage is largely arbitrary and becoming more so. The location of comparative advantage becomes increasingly arbitrary as transportation costs fall, as industrial products become more important in world trade, and as traded products have a higher value-added relative to non-tradables. Therefore according to this argument, politics in the form of policies to provide subsidies to capital and technology formation play an ever more important role in allocating world industry. A corollary for the United States is that as capital and technology shift to lower-wage countries, the new trade composition and interdependence will exert a downward pressure on the average American wage if new employment opportunities are not created in alternative, higher value-added industries.

As trade has integrated economies, national investment policies to influence production have spilled over into the international economy with potential injury to other countries. The trade consequences of these public investment policies can be conceptually separated into those which affect the short-term market share of a country and those that affect the long-term (quasi-permanent) market share, which we might define as "international competitiveness." Present trade law does not make this temporal distinction, focusing solely on observable changes in import market share and domestic profitability and employment. But these may be of short duration. Once the export subsidies are removed (or offset), the increase in foreign market share may shrink as domestic production again becomes economical.

Of greater consequence are policies with long-term effects. A subsidy (or other policy) has enduring effects if domestic production does not become economical after the policy has ended. It is even possible that the trade consequences may occur after the production and technology subsidy have ended. The key is whether some barrier to entry—learning curves, scale, technology, or capital costs—is present after the policy ends. Foreign producers, with the help of the investment or technology subsidy, may establish an industry, gain a technological advantage, price low to capture market share, and displace domestic capacity before the importing country

can replicate the investment. Foreign sellers are then in a position to set new higher prices at the entry-forestalling level, but still above the competitive rate, although this does not have to follow for a loss to occur to a country's competitive position.

Some have argued that investment policy in an era of floating exchange rates makes little difference to the net international competitive position since changes in the foreign exchange rate offset any subsidy effects (e.g., Cooper, 1978). The increase in exports is offset by appreciation in the value of the currency and a subsequent increase in imports. The only change is in the relative prices of tradables and thus in the sectoral composition of production in both countries. There are three problems [1] with this argument: First, governmental controls in capital flows and exchange markets can stave off changes in the exchange rate for lengthy periods, perhaps long enough to drive out capacity in the host country. Even if exchange markets are relatively unencumbered, large inflows of capital can strengthen currencies and depress exports for prolonged periods, driving out domestic production capacity that cannot be easily reinstated when the currency falls. Second, changing the sectoral composition of output and hence employment is itself a major investment and trade problem. Displaced labor often has a difficult time finding employment in other industries even if output is expanding. Third, over the long run, industries with higher growth potential, higher barriers for entry, and potential for higher growth in productivity will produce gains in terms of trade for the exporting country. All countries therefore would prefer to specialize in these exports. Of course, it cannot be predicted with certainty which product lines will be in demand. However, almost all countries look to the technology-intensive industries to be safer bets than primary products. Investment policies that alter the long-term division of labor are therefore of immense potential importance even though the short-term aggregate effects are partially offset through the exchange rate.

Let us then consider several countries' investment policies.

Foreign Industrial Policies: An International Comparison

In briefly sketching seven countries' industrial programs, several impressions emerge: First, there is some evidence that governments everywhere are becoming increasingly involved in subsidizing their domestic industries. Second, governments appear to be increasingly active in promoting new industrial development, thus orienting policy toward accelerating structural change. Third, the purpose and policies of developing countries are considerably different than those of the developed countries. The latter see their future comparative advantage in knowledge-intensive industries and have focused public efforts on high-technology industries; the advanced developing countries are making considerable effort to close the technological gap, but have made their largest gains in

[1] Seamus O'Cleiracain of the State University of New York has pointed out another to me: If nonprice factors such as availability, delivery dates, quality, etc., are important in determining trade flows, and if an industrial policy can affect these, there is no reason to expect that a flexible exchange rate regime will produce a relative price which exactly offsets the non-cost influences of subsidies—especially when the exchange rate is being determined in some portfolio model manner rather through the trade account.

basic industries. Finally, the level of government expenditures to promote industry appears to be less of a predictor of success in establishing international competitiveness than other institutional factors, especially industrial targeting.

Consider, then, key features of the industrial policies of Germany, the United Kingdom, France, the United States as well as Brazil, Mexico, and South Korea.

The Federal Republic of Germany

Business has generally worked more closely with government in West Germany than in the United States, but the federal system accords a strong role to the states. The government has effectively brought several organized groups—labor, employer associations, etc.—into the political process through "concerted action," the liberal concept of the social market economy predominant in the 1950s and 1960s. This produces no overall plan, but does lead to sectoral agreements and regional programs.

The guiding principles include the stabilization of income in declining industries and promoting the development of high-technology industries. This has been linked up with a protectionist sectoral policy in industries such as coal, textiles, and shipbuilding. The government has extended protection to industries such as autos, while encouraging mergers. Subsidies have been extended for research and development in oil, aircraft, and more recently, computers.

The subsidy element of investment policy appears to be increasing. The total subsidies (including tax allowances) amounted to about 1 per cent of GDP in 1975 and about 7 per cent of gross fixed capital formation (de Carmoy, 1978). Mutti (1982:14) using a slightly different definition, reports a figure of 3.7 per cent of GDP for 1976. The German Kreditanstalt reported that preferential capital in the form of loans, loan guarantees, and grants increased threefold between 1970 and 1981 while GNP only doubled. Between 1980 and 1981 alone, this form of subsidy increased as a share of GNP by 13 per cent.

The United Kingdom

The activities of the British government in promoting its industry have evolved less organically than in West Germany because policies have changed rather abruptly with the advent of a new party in power. Moreover, investment policy has by and large been directed at maintaining employment and controlling balance-of-payments disequilibria rather than developing new industries.

Accordingly to the Industry Act of 1975, the government was given selective power to offer financial assistance to industry and organize "voluntary planning agreements." The act established the National Enterprise Board to administer one billion pounds of subsidies to aid in restructuring British industry and in the creation of "national champions." This board was the administrative sequel to the Industrial Reorganization Corporation founded in 1967 by a labor government and later killed by a conservative government.

Under the 1975 program subsidies were granted (together with protection) to the British textile industry, shipbuilding, steel, alu-

minum smelting, aircraft, computers, and automobiles. In all industries, the government tried to reorganize fragmented industries into a few strong firms or create new technologically sophisticated firms (in computers and aircraft) to compete with foreign firms.

Government subsidies amounted to about 1.2 per cent of GDP in 1974 and about 10 per cent of gross fixed capital formation (de Carmoy, 1978). Subsidies shown in national income accounts grew until about 1976. The election of Margaret Thatcher and the conservatives changed policy abruptly toward reducing substantially the scope of government participation in the economy. The Conservative government has tried to "denationalize" several sectors. The net result has probably been to reduce the extent of funds channeled to select industries on the basis of policy.

France

The French state has historically played a more pervasive role in economic development than most of the other European countries (see Zysman, 1978). Industrial policy has therefore been far more aggressive. The Commissariat au Plan brings together representatives of both public and private enterprises as well as government officials to insure close cooperation in policy formation. All industry falls under the economic "tutelage" of a ministerial department, most under the Ministry of Industry and Research. The net effect is more to coordinate private and public activities rather than strictly plan investment. France is the only OECD country besides Japan which publicly announces the sectors it will encourage or discourage (Franko, 1980).

The Fifth Plan (1966–70) emphasized the creation of one or two firms of international scale in most industries, promoting national champions through mergers on oil, chemicals, and aircraft. The Sixth Plan (1971–75) emphasized growth in four sectors—equipment goods, chemicals, electronics, and food and agriculture. The Seventh Plan (1976–80) adopted a more protectionist stand in the face of severe recession, but continued to provide aid to targeted sectors, including autos and steel. Selective credit policies are a primary instrument of channelling credit to dynamic industries and restructuring declining industries (Joint Economic Committee, 1982). The government allocated 5 billion francs for a five-year program in telecommunications and computers. Aircraft and energy, especially nuclear power, where government spending during the late 1970s was 6 billion francs annually, are also targeted sectors. In declining industries—textiles, shoes, handbags, clothing, and watches—the government has "managed decline" by using high interest rates, gradual reduction of subsidies, and before 1980, a willingness to tolerate unemployment.

With the advent of the Mitterrand government in 1980, the state has extended its economic role in the economy. Implicit subsidies through preferential capital to state enterprise have undoubtedly increased. The well-publicized goal of "reconquering domestic markets," aimed primarily at textiles, electrical appliances, and furniture, tends to increase protection. Industry Minister Pierre Dreyfus disclaimed, however, any intention of rescuing nationalized but declining sectors. The official purpose is "to restore the competitive

edge of industry" (Mosley, 1982). Mitterrand is interested in developing new sectors via aid schemes. These include: professional and household electronics, glassmaking, and electronic and computerized office equipment. Some sectors where government involvement was high when Mitterrand assumed office should expect expanded state help: metallurgy, base chemicals, and armaments (Mosley, 1982). At the same time, there is a strong tendency to dismantle the structure of generalized controls and subsidies and stimulate local capital markets. Thus, French policy has moved from one of severe protection to protecting selected industries and using investment policy to create new internationally competitive industries.

Japan

Japanese industrial policy has evolved through several rather long phases—through the period of post-war readjustment (1945–52), industrial nationalization and restructuring (1952–60), the period of internationalization, with expanded trade and foreign exchange liberalization (1960–73), and post-oil policy (after 1973). Each of these phases has been marked by a close, though fluctuating, relationship between business and the state, and by a strong drive to industrialize and close the technology gap (Magaziner and Hout, 1980). Subsidies as an instrument of investment policy played an important role in the first two periods, though less so in the third (Namiki, 1978). They appear to have stabilized as a share of GDP in the fourth period.

The Japanese government exercises a leadership role through the Ministry of Trade and Industry (MITI). Together with representatives of the business community, MITI formulated medium- and long-term national plans (although these do not encompass all sectors, omitting for example, housing and land use). The effectiveness of the program is more to signal public support of key industries rather than to actually plan the flow of capital to each sector.

Post-1973 planning has targeted a set of technologically intensive industries to help reduce Japan's dependence on energy-intensive industries. These include aircraft parts, nuclear power, electronic computers, seabed and aerospace development (Namiki, 1978; Baranson and Malmgren, 1981). Industrial robotics also appears to be another industry that will receive official government support. In response to the Reagan administration's prodding, it also appears that the government will increase its allocation to national defense, and will undoubtedly increase funds devoted to military-related technology. In summary, many of the new subsidies will be destined for technology development and technology-intensive industry.

The United States

Although more reliant perhaps on the market system than other OECD countries, the United States government has historically promoted the growth of its private sector. Diebold (1982:160) notes that during the 18th century "there was a certain coherence" to U.S. industrial policy: It relied on selective protection to limit dependence on imports, expand the domestic market, and promote agriculture. Producer interests were dominant. The government

helped build the eastern canal system and then the railroads law sanctioned the birth of the indefinite-life corporation in the 1880s and large scale industrial businesses began to flourish. Antitrust law, a thread of industrial policy, emerged between 1890 and 1914 as a reaction to the abuse of economic power. The Great Depression and the Second World War dramatically expanded the role of government in industrial development. Since then, defense, space, atomic power, energy, and the environment have occupied center stage as the primary concern for government activity.

As one indication of trends, Magaziner and Reich (1982:241-48) estimate that U.S. expenditures solely on industrial development rose from 3.4 per cent of GNP in 1920, to 9.2 per cent in 1950, and to 13.9 per cent in 1980. Tax exemptions and procurement almost tripled as a percentage of GNP betwen 1950 and 1980. Tax expenditures were targeted to housing, petroleum, coal and timber. Procurement policy benefitted aviation, maritime, semiconductors, and petroleum, among others.[2]

These numbers are open to dispute, but the level of public resources directly or indirectly benefiting selected industries has undoubtedly been increasing in the United States. The decontrol of oil and gas prices during the Reagan administration has reduced an important element of subsidy (to downstream industries), but this has been offset by increases in military procurement and financing of research and development, the near elimination of the corporate income tax, new subsidies for nuclear power development, and the reincarnation of agricultural price supports in key commodities.

In contrast to many countries, the U.S. pattern of promoting specific industries is not oriented to enhancing international competitiveness. This is not to say U.S. policy is incoherent; rather it "coheres" around other goals, such as national defense, the promotion of particular national concerns, e.g., housing and energy.

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[2] R. N. Cooper (1978: 109) lists subsidies that are more directly related to export competitiveness (in approximate order of importance):

Aid to developing countries tied to the purchase of American goods;

The Domestic International Sales Corporation which permits U.S. corporations to defer profits on exports until dividends are remitted to the parent corporations;

The U.S. government subsidies to both the construction and operation of merchant vessels under U.S. registry;

The Export-Import Bank provision of medium-term credit for American exports at lower-than-market interest rates;

Congressional legislation providing subsidies for the export of agricultural products; until 1973 subsidies had been employed through the Commodity Credit Corporation as part of the U.S. domestic price support program. With the fall in commodity prices after 1979, the program has been reinstituted;

A 10% U.S. investment tax credit for investment in new plants and equipment;

Federal spending on services used to support private business, such as airports, air traffic control, harbor maintenance, and postal services; this spending, net of user charges, undoubtedly increases business activity;

Price controls on domestically produced oil and gas amount to an upstream subsidy for energy using producers;

Government procurement may subsidize domestic industry through Buy American tariff provisions, full cost pricing in high overhead (including R&D) product lines;

Other regulations, such as the minimum wage, environmental protection laws, child labor laws, etc., which increase the costs of particular industries constitute a subsidy for unaffected industries to the extent the foreign exchange rate is the adjustment mechanism.

This list is hardly exhaustive. One might add the subsidies to the ill-fated synfuel project, the space program, military grants and contracts for research and development and others.

The Role of Developing Countries

As relatively late starters in the industrialization process, most newly industrializing developing countries (NICs) have relied heavily on the government to promote growth. This has occurred in a much more conscious way than in most developed countries. National policies to encourage capital formation and technological development commonly began with an inward looking import substitution in the 1950s, but by the 1970s, most had become export-oriented. As national strategies shifted toward an export orientation, state enterprise subsidies for exports (often to offset overvalued foreign exchange rates), production subsidies (often through preferential foreign exchange), and performance requirements have been common policies.

Brazil

Brazilian government direction of national growth grew rapidly in the post-war period. A first phase, from 1950 to 1961, extended the process of import substitution begun during the Depression and World War II. Tariff protection and several other incentives were granted to manufacturing industries. Several state enterprises were born, including electrical utilities, steel companies, and the national development bank. Beginning in 1955, foreign firms were granted special incentives to import capital equipment to set up factories, and they responded with dramatic increases in investment. But by 1961, growth rates fell and the import substitution dynamic was exhausted, resulting in a political crisis that brought on a succession of military governments.

The governments enacted a stabilization program that lasted from 1964 to 1967, during which time a crawling peg exchange rate was introduced, indexing for inflation, and an end to subsidies in public enterprise. Beginning in 1968, growth resumed, this time based upon an export drive of manufactured products. Exports of manufactured products grew from a small share of total exports to about 25 per cent by 1973 (Tyler, 1980). Throughout this period, national planning was improved, incentives created for exports and investments in industry.

After the oil crisis of 1973, policy shifted to emphasize greater import substitution (to offset the greater cost of oil), a more rapid expansion of exports, (especially agricultural exports), and greater targeting for technologically sophisticated industries, such as petrochemicals, nuclear power, telecommunications, and capital goods.

The state enterprise sector expanded rapidly, growing from 22 per cent to 27 per cent of equity holdings between 1970 and 1980. This included growth in technologically sophisticated industries such as mineral production, railroad equipment, aircraft, and chemicals. Since these now occupy positions of considerable economic weight in industry as suppliers and buyers, the government has tried (with mixed results) to use them as a policy lever to promote backward linkage industries.

The government relied heavily on subsidies and regulations of various forms throughout the 1970s. In the post-1973 period, for example, cheap credit has been made available to agriculture, to nationally-owned enterprises through the National Development

Bank, and to selected industries such as those in the sugar alcohol program and petrochemical industries. State-owned enterprises became vehicles to keep prices lower than the rate of inflation during the 1975–78 period, benefiting downstream user industries, most notably, agricultural chemicals, steel, and glassmaking industries, and final consumers. Increases in the price of petroleum lagged the world market increases for many months after 1973 but were eventually increased.

Steel prices too were kept low. All of this postponed the adjustment process but did not circumvent it. Eventually prices had to be raised and inflation began to increase (by 1980 it reached 100 per cent). Third, export subsidies were increased throughout the period, in large measure to offset an overvalued exchange. These included direct incentives through the BEFIEX program and tax rebates of the value-added tax on manufactured products. The level of overall subsidies is difficult to quantify; subsidies probably amounted to considerably more than those evident in the United States, perhaps in the range of those found in France. Fourth, the government has bargained assertively with foreign investors over the terms of access to the Brazilian market seeking to promote more rapid technological transfer, reduce its net cost, promote Brazilian-controlled enterprise, and promote exports. Thus, bargaining produced a nationally integrated auto industry, a telecommunications industry, the successful state-owned aircraft industry, and several viable capital goods industries. Performance requirements (mainly local contents) have been used in autos, petrochemicals, pharmaceuticals, and most recently (though not altogether successfully) in computers.

Mexico

The national government has taken a strong role in economic development beginning with Cardenas era in the 1930s. In 1938 the holdings of American oil companies were nationalized to form the first major state enterprise. But a concerted effort at import-substitution industrialization did not begin until the 1960s. During the Diaz Ordaz administration (1964–70), Mexico continued the expansion of the state enterprise that had taken place in the recessionary period after 1958 and subsequent upsurge in nationlism that culminated in the takeover of several key sectors. Import-substitution manufacturing produced growth of 9.1 per cent while the overall growth rate was over 7 per cent for the 1960s.

While some observers have called Mexico "a land of planners" (Hufbauer, et al., 1981), the country confined its efforts to sectoral plans until 1979 when it issued its National Industrial Development Plan, soon followed by the Global Plan in 1980. The idea of both programs is to increase the growth rate, increase exports, especially manufactured exports, and reduce agricultural imports. Manufactured exports had grown fairly dramatically from 37.7 per cent of total exports in 1966 to 53.8 per cent in 1974; with the subsequent growth in oil exports, the share of manufactured exports fell to 16.5 per cent in 1980. Part of the rapid export growth had been due to the Border Industries Program which was established in 1965. In addition, several industries were targeted for special

state-aided growth: petrochemical fertilizers, autos, and heavy electrical equipment.

The government and subsidies have been an integral part of the industrialization strategy. First, the state enterprise sector accounted for about 16 per cent of assets of the 300 largest manufacturing firms in 1972 (Newfarmer and Mueller, 1975:55). After 1974, prices of products sold by state enterprises—including petroleum and gasoline, railroads, electricity, steel, and even tortillas—were heavily subsidized. Railroad subsidies were estimated at $715 million in 1980, electrical utilities at $2.1 billion, and the food distribution system at $1.4 billion (Castillo, 1981). The subsidies to the petroleum sector were made via lower-than-world-market prices to consumers and amounted to at least $3 billion, depending on the basis for calculation. Export subsidies equal to 100 per cent of the value of tariffs on imported inputs were rebated to exporters, and played an integral part in the expansion of exports during the period. Total subsidies were estimated at about 5.7 per cent in 1980 (Castillo, 1981).

Performance requirements proliferate: Auto companies were required in 1977 to increase exports until they equaled imports by 1982; pharmaceutical companies are compelled to sell undifferentiated drugs to the government for distribution; the state-owned electrical utility is using its monopsonistic power to create a capital goods industry; and the government petroleum firm has negotiated with the international petrochemical firms to create a domestic industry. Computers are also the subject of bilateral bargaining.

With the fall in petroleum prices, the advent of the financial crisis in late 1982, and the subsequent agreement with the IMF, government participation in investment regulation and subsidization will undoubtedly be reduced. The government agreed to reduce the fiscal deficit from about 13 per cent of GDP to under 8 per cent as part of the agreement.

South Korea

After 1953, Korea emphasized import substitution industrialization as it reconstructed its economy. While this generated a strong and fairly consistent impulse for economic growth, eventually the small market size and limited natural resources led to a reorientation of import substitution policy in 1964 toward export promotion. Reforms included a uniform exchange rate, unrestricted access to intermediate and capital goods, imports, tax exemptions for exporters, reduced prices on inputs, and access to credit for investment (Bradford, 1982; Wade and Kim, 1978). Economic planning, which began as part of this phase of industrial growth with the first five-year plan (1962–67), was consistently strengthened and became an integral tool for government policy. By many accounts, planning was a major contributor to the success of Korean development during the period (Brown, 1973; Wade and Kim, 1978).

Subsidies through credit to selected industries were used throughout the 1970s to encourage capital formation (although earlier the overvalued currency had also been a direct stimulant to investment in imported machinery). In addition, the numerous state enterprises also sold their output at below-market rates for much

of the 1970s. This appears to have changed with the adoption of the Fourth Five-Year Plan in 1977. Export subsidies were enacted in the 1960s and incorporated into the planning process as part of pledges to export (Bradford, 1982).

Levels, Forms, and Trends of Investment Policies Compared

Aggregate Subsidies and Taxation

Leaving aside the institutional framework for the moment, a comparison of the aggregate level of subsidies and tax incentives offers some indication of the relative governmental roles in attracting (or creating) international capital and technology. Quantitative comparisons quickly lose rigor in the face of differences in national accounts, asymmetries in regulatory practices, and the opaqueness of investment subsidies. Nonetheless, several studies have attempted careful comparisons and their findings are worth recounting.

Mutti (1982), presents cross-national comparisons of six categories of subsidies as a percentage of GDP for seven OECD countries (Table 1). In addition to the caveats adumbrated above, the data are imperfect in one other respect: they do not include subsidies inherent in the defense programs of the countries involved. Column 1 represents the operating subsidies to firms, frequently in the public sector. The relatively high levels of France, the United Kingdom, and Italy are attributable to agricultural subsidies and to the large share of public ownership in utilities and basic industry relative to the United States. Column 2 represents the government share in new investment; this figure is overstated because it does not exclude user fees from public activities, a major source of revenue. Here too the United States ranks lowest among all seven countries. Column 3 is the depreciation of publicly owned capital; even though this represents past funding from previous tax payments, this can be taken as a proxy for the currently available benefits from government investment. Government grants and loans for private investment are included in column 4; by this measure the United States ranks comparably with Japan and just below Germany. Such is not the case for funds expended on research and development where the United States spends the most. The final column is the summation of columns 1, 3, 4, and 5 and 10 per cent of column 6 (on the assumption that most of the subsidy is passed on to foreign consumers). This total indicates that the United Kingdom, Italy, and France are among subsidized economies, while the United States is second only to Germany as the country with the lowest subsidy ratio in the 1970s.

These rankings do not correlate with rapid growth or less precise notions of international competitiveness. Governments in the United Kingdom, Italy, and France subsidize their industry to the greatest extent, yet only France arguably has made consistent gains. Japan, seen as the most competitive, ranks fifth. While the subsidy rate is notably higher than Germany and the United States, the Japanese still subsidize at a rate far below the Europeans. If these broad orders of magnitudes are correct, one has to explain Japanese economic performance on the basis of less quantifiable subsidies, greater marginal efficiency of subsidized investment, or institutional and economic factors in addition to subsidies.

TABLE 1.—AGGREGATE INDICATORS OF GOVERNMENT SUBSIDY POLICIES AS A PERCENTAGE OF GDP, 1976

	Current account	General Government and public enterprises capital		Aids to private capital formation	Funds for R&D	Export financing		Total percent [1]
		Formation	Consumption			Government supported loans outstanding	Percent of exports supported	
Canada	1.7	4.9	2.1	0.9	0.6	0.7	4	5.4
France	2.7	5.2	2.0	0.6	1.0	[2] 0.5	36	6.3
Germany	1.5	[3] 3.4	1.0	0.3	0.9	0.3	10	3.7
Italy	2.6	10.5	2.7	1.1	NA	1.1	9	6.5
Japan	1.3	8.5	2.6	0.1	0.6	2.4	49	4.9
United Kingdom	2.8	8.6	4.3	0.9	1.1	2.1	36	9.3
United States	0.3	2.7	1.9	0.1	1.3	1.5	7	3.8

[1] The final column is the summation of columns 1, 3, 4, 5, and 10 percent of column 6 (on the assumption that most of the subsidy is passed on to foreign consumers).
[2] Includes only loans directly financed by the Banque Francaise en Commerce Exterieur.
[3] Capital formation by public enterprises not reported.
NA—Not available.

Source: Adapted from Mutti, John, "Taxes, Subsidies, and Competitiveness Internationally," NPA Committee on Changing International Realities, 1982.

Unfortunately, time series data and developing-country data are available only for net subsidies as presented in national income accounts (Table 2). If these are taken as representative "tip of the iceberg" subsidies to capital formation, three conclusions can be drawn from Table 2. First, the average level of subsidization has increased fairly dramatically, especially in the developed countries, though with considerable cyclical fluctuation. Second, there is no evidence that the level of subsization on the part of these developing countries by this measure is larger than that of the developed countries. Third, the notion that the United States is less prone to overt subsidies than its major trading partners is consistent with this measure, although net subsidies have been rising at a rate comparable or slightly faster then other OECD countries.

TABLE 2.—NATIONAL ACCOUNT SUBSIDIES AS PERCENT OF GDP, 1955–80

	Industrialized countries								Newly industrialized countries			
	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Average OECD [1]	Brazil	Korea	India	Average NIC's [1]
1955 [2]	0.34	1.75	0.23	1.24	0.13	2.08	([3])	0.96	NA	0.70	NA	0.70
1960	0.81	1.62	0.83	1.46	0.34	1.93	0.25	1.03	0.87	0.12	0.62	0.53
1965	0.82	2.17	1.28	1.37	0.71	1.61	0.45	1.20	1.40	0.01	0.79	0.73
1970	0.87	1.97	1.43	1.49	1.10	1.74	0.50	1.30	0.55	0.19	0.84	0.53
1972	0.83	1.99	1.48	2.29	1.15	1.82	0.59	1.45	0.56	0.30	1.15	0.67
1976	1.73	2.68	1.49	2.60	1.32	2.80	0.34	1.85	0.69	1.29	1.73	1.24
1978	1.42	2.64	1.86	2.92	1.34	2.20	0.45	1.83	0.86	1.34	2.28	1.49
1980 [4]	2.34	2.51	1.59	3.01	1.32	2.32	0.43	1.93	[5] 0.60	[5] 1.16	[5] 2.36	1.37

Source: U.N., Yearbook of National Accounts Statistics, vol. I 1980 (data from table 1.3).
[1] Unweighted average for the OECD and NIC countries shown.
[2] Data for 1955: U.N., "Yearbook National Accounts Statistics," vol. I 1966 (Data from tables 2 and 8).
[3] Negligible.
[4] Data for 1980: OECD, National Accounts 1951–80, vol. 1, Main Aggregates, 1982.
[5] Data for 1979, the last year available.

Note: National account subsidies are current subsidies as shown in national accounts and include net losses on state enterprise, subsidies to research and development, direct export subsidies, direct agricultural price support programs and the like. They do not reflect, however, implicit subsidies effectuated through loan guarantees, tax and other fiscal incentives, and indirect subsidies, such as below-market prices of final products or interest on loan capital.

Subsidies to capital formation, however, are only one side the net governmental impact on industry. The other side is taxation and "tax expenditures." Mutti (1982) compares the overall order of countries according to overall level of taxation in seven OECD countries. Ranked by tax revenues as a percentage of GDP in 1976, from highest to lowest taxation, the seven were: France, Germany, and the United Kingdom (identical levels), Italy, Canada, the United States, and Japan. Both Germany and Japan have outperformed the United States in the 1970s. Again, there appears to be no correlation between aggregated gross investment subsidies and international competitiveness.

The "bottom line" of subsidies and taxation is the net fiscal impact of policies on capital formation. The greatest net benefit—overall subsidies to business (as defined in column 8, Table 2) less the corporate income tax—accrued to countries in the following order (from highest to lowest): the United Kingdom, Italy, France, Germany, Canada, Japan, and the United States. Once again, the order seems to defy any correlation with rapid growth rates during the 1970s (Mutti, 1982).

Since 1976, these relationships are likely to have changed. The Thatcher government has cut general subsidies and raised taxes, and probably lowered its net subsidies. The French government has probably increased overall subsidies while holding tax levels constant since the advent of Mitterand. The Reagan administration has cut corporate income taxes dramatically, probably raising the net capital subsidy. Ironically, the Thatcher and Reagan administrations, of all the OECD governments, have provided the largest increases in subsidies to capital. (Table 3). This suggests that the relative position among countries may have changed in the years since 1976, and that the income distributional balance may have swung away from labor subsidies and toward capital subsidies.

TABLE 3.—TAX SUBSIDY RATE [1] : MANUFACTURING FIXED INVESTMENT—AS PERCENT OF ASSET PRICE [2]

Country	1973	1980	1981
Belgium	−2.4	−2.4	−2.4
Britain	9.8	10.9	13.1
France	1.2	1.2	4.4
Holland	−4.3	4.2	6.2
Italy	4.1	5.0	5.0
Japan	−3.4	−3.4	−3.4
United States	1.3	3.3	12.8
West Germany	−6.7	−5.5	−5.5

[1] The difference between the actual tax reduction resulting from the purchase of plant or machinery and the tax reduction under a neutral system, with the difference expressed as a proportion of the asset price.
[2] A subsidy, minus a tax.
Source: "Economist," December 25, 1982, as compiled from the Bulletin for International Fiscal Documentation, July 1981.

Even so, the conclusion stands that the aggregate relative levels of net subsidy probably are not a reliable determinant of overall international competitiveness. Consideration must be given to purpose, less quantifiable public interventions, and the effectiveness of policy.

Industrial Targeting

Targeting of investment policy has been central to the success of Japan and, to a lesser extent, France. Based on government-business planning in the 1940s, Japan eventually built one of the most efficient steel industries in the world, despite the fact that domestic sources for raw materials, energy, and technology were limited. Its electrical equipment industry and consumer electronics industry were built with close business-government planning. More recently, policy focuses on computer, optical fibers, robotics, microprocessors, and office machinery. French policy supports the development of six key sectors: electronic office equipment, underwater exploration equipment, biotechnology, robotics, consumer electronics, and energy conservation equipment (Baranson and Malmgren, 1981).

These industries recently targeted by both governments share a number of characteristics: they are knowledge-intensive, high barrier-to-entry, and have a high income elasticity of demand. Selecting industries because they are knowledge-intensive allows countries to build upon perceived potential for comparative advantage and rapid productivity gains. High barriers-to-entry imply that once an advantage is established it cannot easily be eroded; they may also imply a need for some initial government participation to offset the advantage of established foreign firms or to bring the technology into commercial production. The high income elasticity of demand characteristics ensure these industries will be growth industries in the future. These programs have the greatest potential for impact upon international trade patterns, even though their near-term trade effects may be minimal.

Governments in the United States and Western Europe also play an active role in steel, autos, textiles, and energy, although these policies share a defensive character designed to preserve international market share and domestic employment rather than adding to world capacity. The United States has a markedly smaller role in these industries, attributable to its large market, the historical strength of its private sector, and its aversion to industrial policy.

The advanced developing countries have focused on mature high-barrier industries—steel and shipbuilding—or high-barrier industries controlled by multinational companies—autos, chemicals, petrochemicals, and capital goods. As a result, their share of world exports in high-skill, low-capital-intensity products (rubber, printing, electrical machinery, nonelectrical machinery, and transportation equipment) has increased fairly dramatically (UNCTAD, 1982:75–87). Many newly industrializing countries see these industries as the heart of a modern industrial base with abundant linkage effects in skill development, employment, and demand for inputs from other industries. More recently they have sought to enter some high-technology industries, primarily production, for their domestic markets.

The peculiar nature of the barriers to entry confronting firms in the newly industrializing countries requires the use of different industrial policies than commonly found in the developed countries.

In the heavy industries, barriers to international entry involve economies of scale, capital requirements, and international marketing. Many countries have domestic markets that are too small to support firms of competitive scale, even though they would have an inherent cost advantage (wage rates) were they producing for world markets. Similarly, the vertical or horizontal integration often accompanying multinational ownership often constitutes a entry barrier to domestic production for export. In both of these instances, industrial policies relying upon state ownership, preferential capital or subsidies, or performance requirements may be necessary to realize potential comparative advantage.

Summary Patterns

Several long-term patterns in the trends and purposes of industrial policies are apparent. First, within the OECD countries, industrial policies seem to have moved beyond the preservationist policies of protecting weak industries toward "accelerationist" policies of more aggressively creating and promoting high-technology industries. At the same time, some governments have retreated from direct allocation of capital, preferring to make available cheap capital for a select group of industries while encouraging the growth of private capital markets. This may be the logical result of the development process. If Japan can be taken as a model, the planners at MITI arguably play a smaller role in the allocation of total investment than they did 20 years ago. The French experience, however, might temper this generalization. Nonetheless, it seems reasonable that with economic growth the pattern, and perhaps the scope, of intervention should change—because capital markets become more developed (and internationalized) while investment decisions become more complex to manage publicly, because firms develop an international interest that transcends domestic economies, and because the indirect, larger average size of firms brings an increased internal financing capability that makes them less dependent on government planners. Similarly, spending for research and development increased as a share of GNP between 1962 and 1978.

Second, policy within the OECD seems to converge on a sectoral basis as well. Nearly all the OECD countries have strong public policies to defend their auto, steel, shipbuilding, and aircraft industries. Those countries with accelerationist policies toward high-technology industries have tended to overlap in the same industries: computers, semiconductors, robotics, and office equipment. This convergence indicates that governments may begin to compete with each other in offering subsidies, tax incentives, incentives to technological development, and the like to promote specific industries.

Third, concomitant to the transition in industrial policy in the North has come a marked transition in the newly industrializing countries of the South: the transition from the import-substitution industrialization strategies of the early 1960s to the export-promotion programs that blossomed during the 1970s. Government policies typically have used a variety of instruments to convert an industrial base built upon import substitution to an internationally competitive, outward-oriented industry. This has required various

instruments: state enterprise, performance requirements, aggressive bargaining with multinationals, and export incentives. The industrial targets tend to be mature industries in the developed countries, but also some high-technology industries.

The industrial policies of developing countries are quite different than those of developed countries because the NICs confront different barriers to entry. These countries confront scale and international marketing barriers (often in addition to technology barriers) and they do so with the handicap of a much smaller private sector. This suggests that state participation will be more direct and more targeted since industrial gaps are more obvious in countries with small industrial bases and it may take the form of bargaining with foreign multinationals since the latter frequently control marketing channels and technology.

By their very nature, these policies are more likely to have direct spillover effects on trade than are the indirect policies of the more advanced countries. Smaller domestic markets imply that in industries with high-scale barriers, such as autos, tractors, and large power generating equipment, international efficiency sooner or later requires exporting. Second, the mature industries tend to have slower growth so that new additions to capacity are more noticeable. Firms in the NICs in steel, petrochemicals and some minerals were creating new capacity during the 1970s at a time when the major suppliers in the OECD countries were cutting back on capacity. Third, the skill gap is much narrower than the wage gap between the advanced countries and the newly industrializing countries for many industries. Thus wage rates may accord production facilities in the developing countries a substantial cost and productivity advantage in many industries.

Conclusions and Policy Implications

Two quite different conflicts emerge over industrial policies. The first is within the OECD. On the one hand, industrial policies are in conflict when many countries have the industry and none is willing to cede it to the other as market (or nonmarket) forces would dictate. The evolving resolution of these protectionist conflicts seems to be in the form of quasi-negotiated de facto sectoral arrangements as in steel, autos, and textiles—at least until the world economy begins to grow convincingly. On the other hand, conflicts are increasingly surfacing over indirect, or even direct, support for particular high-technology industries. The semiconductor suit and Houdaille petition are recent examples. The 1982 GATT Ministerial failed to produce multilateral agreement to address these problems, and the onus has been effectively transferred to working parties for further action.

The second set of conflicts occurs between developed countries and the NICs. The latter tend to pose a more destabilizing force to the world trade hierarchy. On the one hand, they tend to resort to "unorthodox" policies (such as bargaining with state multinationals, state enterprise, and performance requirements) with greater trade effects, and on the other they pose a competitive threat because of the increasingly high ratio of skills to wages. These threats are mitigated in the short run by the relatively small mag-

nitudes of exports from developing countries, but they will probably grow as the NICs develop. Renewed economic growth can assuage the conflict, but probably not eradicate it.

The United States has a direct, immediate interest in ensuring that these conflicts do not escalate into a self-reinforcing spiral of trade-contracting protectionism. It also has an interest in avoiding direct government-to-government competition for particular industries that can only drain all governments while maintaining excess world capacity and subsidizing inefficiency. Since these interests are shared by other governments, some multilateral framework within which to legitimize categories of industrial policies while settling disputes over specific policies is clearly in the interest of all. Needless to say, this is easier said than done.

U.S. policy is obviously crucial to these efforts. Three broad courses of action would lay the groundwork for an economic policy serving domestic interests but consistent with a foreign economic policy ultimately contributing to multilateral accords:

The United States should understand and make transparent the extensive role of its own government in promoting industry so as to make more informed public investment decisions and be more credible in negotiations with trading partners;

The United States should embark on the political process of deciding more forthrightly upon its own balance between preserving existing industries, promoting technologically complex industries, and letting markets work so as to make more informed public investment decisions;

The United States should accept the legitimate aspirations of countries further down the industrial and trade hierarchy to use public policy in their sovereign interest of development in exchange for their agreement to accept responsibility under multilateral accords as they approach income and technological parity with the developed countries.

While aspects of these propositions build on current U.S. policy, other aspects would represent a marked shift.

The U.S. government's role in the economy, while apparently less by some measures than many of its trading partners, is not nearly as small as American trade negotiators would portray it. (Nor can it be made as small as the present administration would perhaps wish.) Current programs are sufficiently diverse, however, that no accurate, accepted accounting is available. Moreover, there is no reliable assessment of the impact of these policies on international competitiveness.

A first step toward filling this strategic informational void is to create a government vehicle to compile these data, estimate the current levels of subsidies and analyze the effects of current policy on particular industries. It would perform analytical tasks similar to those of the Office of Technology Assessment and the Bureau of International Labor Affairs in the Department of Labor—but with greater resources and political authority. This analysis is a fundamental prerequisite for an informed political process.

Second, the United States should establish its own balance between preserving its existing domestic industry and accelerating the processs of industrial change. This is fundamentally a political decision. Economic analyses of the plights and prospects for partic-

ular industries can go far toward illuminating the nature of a policy crossroads, but ultimately the choice must be made in the political process. As it stands, the political process is badly served because there is no public agency to evaluate authoritatively private claims about an industry's situtation, the current level of government support (or hindrance), or the consequences of different policy scenarios toward the industry. Only the most politically powerful industries or firms receive trade protection or public aid. Moreover, there is no guarantee that the protected industry will be restructured.

As part of the decision to protect or accelerate U.S. industrial development, Congress might well consider establishing a national development bank. Adequately funded, the bank could be a vehicle for promoting restructuring in exchange for subsidized capital. Its purpose would be to provide long-term debt capital at subsidized rates in exchange for agreements between management and labor on future investment programs and wage arrangements. It might also augment private capital in high-technology industries.

The virtue of this policy is that it keeps markets open and maintains the winds of competition, thus providing an incentive to complete the restructuring. Its costs to the public are measurable; they can be made transparent and temporary. Third, it could be a mediating force in industrial relations that just might provide new elements of trust for all parties, enabling long-term agreements.

The idea of a national industrial development bank is not without problems. There is always the threat that politics will push ever greater amounts of capital into its coffers. This might be offset by limiting its capitalization to a fixed share of capital markets. Second, the funds might not be used effectively. They might be used to subsidize industries that have no hope of regaining competitiveness, or they might be squandered if bargains are not kept or if adjustment does not occur. Clear guidelines need to be articulated on the use of such funds and control of loans after they are made. Consideration might be given to placing a public directors of the corporate recipients of large capital inflows. (They should reside at corporate headquarters, have an independent budget, and free access to all meetings to ensure the public interest is served.) A third objection is that its lower interest rates of the bank will be subsidized from higher rates in private capital markets. This is probably correct, depending on the source of funds. If the funds came from private capital markets, the size of the capitalization would probably be small relative to overall market size, and probably have a marginal impact on free-market rates. If the funding source was linked to Hufbauer and Rosen's (1983) idea of replacing all quotas in international trade agreements with tariffs, the new revenues would come from tariff collections at the expense of profits now accruing to U.S. competitors; this would produce a net gain for the United States and reduce the actual cost to the Treasury. Innumerable other objections and responses could be outlined, but the point is that, while there are many pitfalls, the idea should be fully explored in the political arena.

Finally, the United States should consider developing a more cogent technology policy. This is addressed in the next chapter by Flamm. It is clear that future U.S. international competitiveness is

best served by building up its technological infrastructure, including its basic educational system, its research and development capacities, and its capacity for commercial innovation. Indirect subsidies to these activities are more economically justifiable than direct subsidies of other forms, they are more in keeping with American traditions, and they more directly respond to the foreign industrial policies of the main U.S. trading competitors.

These policy actions would aid U.S. attempts to build a viable multilateral framework for the conduct of industrial policy. At home they offer an alternative to outright protection. To the extent that protection were part of the U.S. program, these mechanisms would make restructuring industries more politically feasible. Furthermore, these measures would help make domestic subsidies transparent. In international negotiations, with its own policies made more transparent, administrations would find it easier to demand transparency from other countries. At the same time, with a national development bank in place and an articulated technology policy, the United States would be in a stronger bargaining position to negotiate limitations on indirect subsidies in a more serious fashion.

Developing countries require special consideration for they are caught in an historical and institutional bind. On the one hand, they cannot fulfill their national development aspirations without strong public participation in the development process, and they must export. On the other hand, sectoral restraints in the OECD countries on product lines in which they might otherwise have a low-wage comparative advantage, most notably in textiles, apparel, and agricultural products, reduce the growth rates of their exports. A U.S. negotiating position which fails to recognize this bind is doomed to feed inadvertently the fires of protection—to the detriment of the very considerable U.S. stake in the Third World development.

This is not to say that the United States should overlook export subsidies and other trade distorting mechanisms that injure its domestic industry. Rather, the question is how to formulate a negotiating strategy which will give incentive for developing countries to avoid practices which injure American industry while permitting them to realize national development objectives.

Elements of this negotiation might include phasing out of the sectoral agreements that impede the growth of labor-intensive industry in developing countries, restructuring the cascading tariff system that discriminates against processing of developing countries' raw materials, and reducing domestic agricultural subsidies. These measures inadvertently force developing countries into capital- and technology-intensive industries in which the United States should have a comparative advantage. In exchange, negotiations could seek the establishing of principles of graduation applied to industrial policies that affect comparative advantage.

In the meantime, the central thrust of the measures recommended in this paper, even if containing elements of temporary protection in exchange for restructuring measures, will probably offer a more progressive mix of policies for developing countries than current policy directions. Current U.S. policy is to bargain vigorously in multilateral fora for greater market access in developing coun-

tries, while closing markets at home, selectively based upon (often arbitrary and unilaterally determined) violations of multilateral agreements; on the domestic front, policy responds only to the most politically powerful industries, firms, and interest groups in the context of a patchwork of programs to promote domestic industry around goals other than international competitiveness. This program can only result in a more closed market for developing countries even if economic growth resumes. A national development bank to aid in restructuring American industry together with a vigorous technology policy—in lieu of unlimited and unrequited grants of protection to domestic industry—are most likely to aid the cause of American and international development.

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II. TECHNOLOGY POLICY IN INTERNATIONAL PERSPECTIVE

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INTRODUCTION

Current discussions of the desirability of industrial policy are generally based on one or more of four distinct premises. First, it is often observed that a variety of industry or sector specific government policy measures, or general policies that have differential effects on industries, exist, and that rather than rely on lobby efforts to decide the mix and impact of these measures, a systematic attempt to rationalize policy in accord with some long-run vision or plan for allocating resources across sectors, ought be implemented (Magaziner and Reich, 1982; Economic Policy Council, UNA-USA, 1982). A second rationale argues that other countries have highly interventionist industrial policies, and that in the absence of acceptance of the workings of the unfettered free market by our major trade partners (in this view, the optimal state of affairs), the U.S. ought adopt an industrial policy as an act of economic self-defense.[1] A third argument often made is that the function of an industrial policy is to speed long-run adjustment, not because the untrammeled workings of actual markets are incapable of moving the economy to a new and efficient mix of industries as economic conditions change, but because the short-run disruptions associated with an unguided transition are costly and avoidable. Hence, if it is possible to avoid these costs through the judicious application of an industrial policy, it ought be done.

A fourth, and most controversial basis for an industrial policy, is that markets are theoretically or practically incapable of solving certain types of resource allocation problems.[2] This last argument for an industrial policy is intimately related to the growing literature on the economics of investment in innovation and invention.[3]

The existence of an industrial policy oriented toward technology can be explained as a response to the deficiences of perfectly competitive markets in allocating resources to invention in a socially

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[1] This appears to be the basis for the Reagan administration's technology policy. The recent Cabinet Council on Commerce and Trade report on the subject ("An Assessment of U.S. Competitiveness in High Technology Industries," October, 1982) concluded that "* * * the industrial policies of foreign governments have substantial effects on the ability of U.S. industry to compete * * * the disruption of market signals and resulting resource flows affect not only the domestic market of the country applying them, but international markets as well * * * [they] can significantly alter the assessments U.S. firms make of the risk associated with an investment or reduce the potential market for a U.S. firm's product. In addition, industry policies can actually take away customers for U.S. products." (P. 38)

[2] That is, there is a divergence between private and social returns on investments, either caused by imperfections in markets, or by the nature of the goods itself.

[3] The term innovation is generally used to describe the first commercial application of an invention.

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optimal manner. Different national industrial policies can be understood as a variety of responses to a common set of economic problems raised by the peculiar attributes of technology, and the success of industrial policy measurable in terms of its effectiveness in dealing with these problems.

Doubts about the ability of perfectly competitive firms to engage in the socially appropriate amount of investment in the development of technology were articulated by Joseph Schumpeter, who in a classic statement of the hypothesis, argued that competitive firms, while producing a statically efficient allocation of resources (given the current technology), were incapable of investing sufficient sums in the dynamic activity of improving technology (Schumpeter, 1950, Chapter VIII).

Schumpeter held this view because he thought monopoly necessary to capture the economic benefits of a superior technology for the innovating firm. Thus, the static efficiency resulting from (along with other assumptions) competitive firms operating in free markets was obtained at a dynamic cost of sluggish technological change. Schumpter concluded that some degree of monopoly was a price to be paid for growth in a capitalist economic system.

As might be expected, such a position, imbued as it is with doubt about the advantages of the textbook world of perfectly competitive markets, has been the subject of heated debate. Without coming to a clear conclusion over the issue of whether a market system generates too little or too much research and development expenditure, the subsequent literature analyzing this point, by and large, has concluded that there is no reason to expect market capitalism to produce exactly the socially optimal investment.[4]

Since much of the current debate over industrial policy seems to pay particular attention to the so-called high technology industries, it seems appropriate to review the arguments for market failure in the allocation of resources to research and development activities, with an eye to their implications for an industrial policy. First, a brief synthesis and summary of the theoretical literature on investment in innovation is presented. It will be seen that the nature of market structures in industries using technological advances is critical to an analysis of inventive activity, and, in fact, the interaction between innovation and market structure is the cause of considerable complexity in models of research investment.

A subsequent section examines other types of difficulties associated with high-tech industries, and how an industrial policy might respond to these problems. Later sections examine the nature of actual technology policies in the United States, Europe, Japan, and the Third World, and how they might be evaluated as real-life responses to the rather abstract complications suggested by economic theory. Technology, in addition to being an instrument of competition between firms, is critical to economic and political competition among nations, and attention is directed to some of the international dimensions of technology policy. Finally, possible policies aimed at rationalizing the international competition in technology are explored.

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[4] This literature is reviewed in Chapters 4 and 5 of Kamien and Schwartz (1982).

The Limitations of the Market

The wave of interest in quantifying the effects of technological progress that followed World War II was itself a product of the technological breakthroughs that won the Allies the war,[5] as well as the technological competition in nuclear weapons and delivery systems that came to define both Cold War and detent in the following decades. Successful research programs became a politico-military objective, and pioneering studies of the economics of research carried out by Hitch (1958) and Nelson (1959) at the Rand Corporation. Wider interest by economists in technological change began to develop around the work of Solow (1957), and successive generations of growth accountants who attributed very substantial portions of the GNP to unmeasured technical advance. Theoretical analysis of the Schumpeterian hypothesis was stimulated by a classic article by Kenneth Arrow (1962), which argued that "we expect a free enterprise economy to underinvest in invention and research (as compared with an ideal) because it is risky, because the product can be appropriated only to a limited extent, and because of increasing returns in use". Since these ideas have largely defined the subsequent literature, it is useful to briefly consider them.

Arrow started by observing that research or invention are inherently risky activities, characterized by uncertainty about the nature of the results to be achieved. Since the economic institutions needed to bear risk efficiently in an idealized market economy—a complete system of commodity-option markets—do not in reality exist, risk must be borne by the innovator. If individuals are risk averse, then they may invest less than the socially optimal amount in risky research.[6]

Second, Arrow pointed out that external economies were generally created by investments in research and innovation. When new ideas or techniques are developed, it is very difficult to sell or transmit them without placing some information about their nature in the public domain. The patent system is a very imperfect instrument for appropriating knowledge created by research and development activity, since one cannot make a claim to failed ideas discarded after costly research. Since the costs of transmitting information are quite low (in an idealized world, zero), the costs of enforcing property rights to knowledge will be quite high, and violations quite difficult to detect.

These inherent difficulties in appropriating the output of research activity create externalities associated with the production of invention, which are presumed to make private return significantly smaller than social return to inventive activity. One might also suppose that in basic, as opposed to applied research, the difficulties in appropriating the product of research are most pronounced.

Last, argued Arrow, "a given piece of information is by definition an indivisible commodity, and the classical problems of allocation in the presence of indivisibilities appear here" (Arrow, 1962). The costs of developing an invention are fixed, and the output in which

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[5] First and foremost, the development of the digital computer and the breaking of the German code systems allowed the Allies to read virtually all important Axis cipher traffic.

[6] This problem, of course, is not unique to invention.

it can be used unlimited, creating economies of scale in producing the goods in which it is embodied. As a consequence, a perfectly competitive market for invention cannot exist.

Furthermore, these economies of scale in the use of an invention will also lead to underinvestment in research and development, even if difficulties with uncertainty and appropriability can be assumed away. Unchallenged monopoly in the user industry will further reduce the incentive to invest. The essence of this argument is the notion that a monopoly will always have less to gain from developing an innovation than an outside inventor, because the outside inventor realizes an additional profit due to seizing the monopoly position.

This argument might be used to explain an empirical characteristic of innovations. It is very common (at least in the U.S. electronics industry) for engineers and scientists to leave a large firm unwilling to pioneer a new process or idea, start their own small firm to do so, grow to become a major force in the industry, and then in turn find their own staff leaving to work on ideas they are reluctant to finance. (That this is more important in the U.S. than in other industrialized economies may reflect the relative depth and openness of U.S. capital markets.) While the sociology of the large firm certainly plays some role in this process, a new idea will always be more economically attractive if it propels a firm to a dominant position in an industry, rather than improves on an established position of market power.

Some Qualifications

This thesis (that market economies will underinvest in research activity) has been challenged by later writers. One strain of thought points out that private returns can be generated by redistributive transfers arising from an invention, and that these purely pecuniary returns may well exceed the social value of an invention (Eli Whitney, for example, might well have done better to buy up cotton land than to fight off copiers of the cotton gin; Hirshleifer, 1971).

Another challenge to the underinvestment thesis hinges on the role that competition in the act of invention can play in establishing market power. Arrow's argument was constructed by comparing the incentive to innovate of a monopoly with that of an independent inventor, taking the inventor's monopoly over a potential innovation (as opposed to the market structure of a potential user industry) as a given. When firms can compete in the development of an invention, rent-seeking firms ought to be willing to spend up to the potential monopoly rent received by a successful innovator in their drive to be first to innovate. In models with such rivalry among inventors, too much research expenditure can be generated, as resources are spent for the sole end of beating out competitors (Scherer, 1967; Barzel, 1968). Such spending can clearly exceed the socially optimal rate of expenditure, as the social benefits of speeding up the innovation fall short of the private return to being first.

In fact, one can even think of circumstances where a firm, if possible, will spend research monies to copy, or "patent around," an existing improvement pioneered by another firm, to obtain a por-

tion of the monopoly profits. Such an expenditure will bring zero social benefit, since it exactly duplicates the effects of an existing technology, yet will be privately profitable. The problem of research duplication is a special example of how research competition in a quest for monopoly rents can result in excessive, or unproductive, investment in inventive activity.

In summary, capital market imperfection, difficulties in appropriating the fruits of research effort, and economies of scale in use, create market failures intrinsic to research activity. Depending on the assumptions about firms and market structure adopted, research expenditure greater or smaller than the social optimum may be generated. The only general consensus prevailing in the theoretical literature is that there are no grounds for believing the correct amount and type of projects will be undertaken. This theoretical argument for intervention in the market for research is bolstered by an extensive empirical literature which consistently documents social returns to research investment far greater than private returns (Mansfield, et. al., 1977). The desirable role of a technology policy would then seem to be to ensure that projects with high social returns are undertaken, while minimizing wasteful duplication of research.[7]

Other Problems in High Technology Activities

Any attempt to formulate a technology policy is further complicated by certain characteristics of the products embodying the results of research investment. Such products are, in general, the most competitive products produced by the developed industrial economies. While the trade balance for mature manufactured goods with well-known production processes, now mastered by the more advanced developing countries, is deteriorating with intense competition from newly industrialized countries capitalizing on cheap supplies of labor or natural resources, net exports of technology-intensive goods have been and continue to be responsible for high growth rates of output and large inflows of foreign exchange. The rapid growth of high technology output in the older industrial nations offers promise as a means of retaining an internationally competitive industrial base and redirecting the entire economy back to the high-growth path enjoyed in the postwar decades.

In the overall U.S. manufacturing economy, for example, the value of shipments increased by an average annual rate of 3.2 per cent over the 1972–1978 period. Forty-five 4-digit industries grew at least twice as fast as all manufacturing. The development of new products was a key element in the rapid expansion of over three quarters of these industries (U.S. Department of Commerce, 1982). Significant export growth was in all cases associated with new products. Six industries (calculators, computers, optical systems, X-ray apparatus, semiconductors, and military tanks) grew at greater than four times the overall rate, and all were arguably high-technology products; semiconductors, at 19.1 per cent per annum, was the leading sector. High technology products seem to play a promi-

[7] For a theoretical analysis integrating the effects of market structure in a user industry with competition in invention, see Dasgupta and Stiglitz (1980).

nent role in industrial dynamism, creating a broad wave of technological externalities, and raising the productivity of customer and supplier industries in ways often unforeseen and unmeasured.

These technology-intensive goods also play a key role in the development of advanced military systems; indeed, many of these critical technologies (computers, semiconductors, airframes, communications, guidance and control systems) can be traced to development programs initiated during World War II. Because of their significant military value, national security issues broader than mere economic return are raised by investments in these areas, or the transfer of these technologies and trade in products in which they are embodied.

Also, manufacture of high technology output is often characterized by significant "learning economies" (the dynamic equivalent of economies of scale, with cost dropping over cumulative output as the result of learning from experience in production. This may result in high barriers to entry and oligopolistic market structures, as well as an "infant industry" argument for protection or subsidization of the industry (Hoggendorn and Brown, 1979; Spence, 1981). In fact, in the presence of such an experience curve, the firm with greatest cumulative output has the lowest costs. This suggests that some sort of "rationalization" policy, weeding out the weakest start-ups and concentrating production in those few most promising firms, might be useful in developing international competitiveness.

Finally, research projects make intensive use of highly specialized and expensive skills and manpower. Very expensive training and education is embodied in individuals employed in these areas. It is unprofitable for the firm to pay for this training, since the skills are generally useful outside any specific firm, and there are few practical ways for a firm to limit the mobility of employees it trains. Limitations on the ability of individuals to borrow against future earnings make it difficult for a research worker to invest in his training. Thus, imperfection in markets for human capital seem likely to result in underinvestment in the skills essential to successful research, and thus to make them more expensive than would be desirable.

In short, the strategic importance of high-technology products, the entry barriers created by learning economies, the technological multiplier effects of advanced industries on the remainder of the economy, and the failure of existing institutional mechanisms to generate the socially appropriate stock of skills used by research activity are further arguments for a set of policies to foster technologically advanced sectors. As shall be seen next, a broad spectrum of policies with this aim can be enumerated, and have been used.

A Historical Perspective

The argument can be made that technology policy, as an organized undertaking of government, has ebbed and flowed with the tides of international political and economic competition. The experience of World War II was a compelling argument for the strategic advantages of a superior technology, and that lesson was reflected in a huge infusion of resources into research and develop-

ment in the United States, as the strains and tensions of the Cold War worsened. In 1955, research and development outlays amounted to a little over one and one half per cent of U.S. GNP; by 1960, that figure had risen to about 2 and two-thirds per cent. Federally-funded defense and space expenditures accounted for much of that growth. In 1955, defense and space amounted to 49 per cent of all R&D; in 1960, about 55 per cent. The total Federal share of R&D spending went from 57 to 64 per cent of the total over these years. (See Table 1.)

The growth rates of real R&D expenditure were quite extraordinary—in 1956 alone, real spending rose over 31 per cent. Furthermore, since these figures exclude capital expenditures, and vast amounts of hardware procured for the defense and space program, whose costs paid for much of company-funded R&D, the true government role in paying for research over these years loomed even larger.

The importance of the Federal government in supporting research remained relatively stable through the early 1960's, since the growth of the space program coincided with the slowdown in other military research that occurred as the larger ICBM missile systems went into production. By 1965, space activities alone accounted for 21 per cent of all U.S. R&D.

TABLE 1.—R&D SPENDING IN THE UNITED STATES

[Constant 1972 dollars (using implicit GNP Price Index)]

Year	Total R&D in billions of 1972 dollars	Federal spending as a percentage of total	Defense and space as a percentage of total
1953	8.7	53	49
1955	10.1	56	49
1960	19.7	64	55
1961	20.7	64	56
1962	21.8	63	55
1963	23.8	65	55
1964	25.9	65	56
1965	26.9	65	54
1966	28.4	64	52
1967	29.2	62	49
1968	29.8	61	48
1969	29.6	58	45
1970	28.6	57	43
1971	27.8	56	41
1972	28.5	56	41
1973	29.2	53	38
1974	28.8	51	35
1975	28.2	51	34
1976	29.6	51	34
1977	30.7	51	33
1978	32.2	50	31
1979	33.8	49	30
1980 [p]	35.1	48	30
1981 [e]	36.1	47	31
1982 [e]	37.0	47	32

[p]: preliminary; [e]: estimated.

Sources: NSF, "National Patterns of Science and Technology Resources 1982"; 1953–76, U.S. Department of Commerce, Bureau of the Census, "Historical Statistics of the United States, Colonial Times to 1970", Series W109–125; "Statistical Abstract of the United States, 1979", Series 1045–46.

The role of government was only slightly less pervasive in industrial research and development. In 1960, 58 per cent of R&D performed by industry was paid for by the government; in 1965, 55 per cent (See Table 2). Again, this does not include the indirect finance of research through premium prices paid for shipments to the government. The share of technology-related spending in U.S. GNP reached its peak in the mid-1960's—at 2.96 in 1964 (See Table 3).

In subsequent years, however, research in the United States went into a rapid and noticeable decline. Real R&D spending remained roughly constant over the 1967 to 1977 period. Share in GNP reached a low of 2.23 per cent in 1978.

A decline in Federal support, undoubtedly related to the financial demands of the war being fought in Indochina, had much to do with this drop. The Federal share of U.S. research funding declined steadily over the late 1960's and most of the 1970's, reaching a low of about 50 per cent in the late 1970's. Central government finance of R&D performed by industry underwent a parallel decline, dropping to 43 per cent in 1970, and held roughly constant at 36 per cent over the mid to late 1970's. The coincidence of this decline with a slowdown in productivity growth in the United States has been noted by economists (Mansfield, et. al., 1982, Chapter 6).

Since the late 1970's there has been some resurgence in government support for research. From 1976 on, real Federal research support shows positive growth, and, as shall be discussed below, something of a boom in military R&D appears to be developing once more.

TABLE 2.—GOVERNMENT AND OTHER [1] SUPPORT FOR R&D

[As a percentage of all funding]

	1967	1973	1975	1977
France:				
All [2]	65	58	56	53
Business [3]	39	33	28	25
Japan:				
All	37	39	43	41
Business	1	2	2	2
United Kingdom:				
All	53	51	55	NA
Business	34	33	31	NA
United States:				
All	67	58	57	56
Business	53	42	36	35
West Germany:				
All	42	50	48	44
Business	18	18	18	16

[1] Includes government, nonprofit, and higher education as sources of funding.
[2] All R&D performed.
[3] R&D performed in business enterprise sector only.

Source: NSF, "Science Indicators 1980", appendix tables 1–7, 1–8.

TABLE 3.—RESEARCH AND DEVELOPMENT EXPENDITURE AS A FRACTION OF GNP

	France		West Germany		Japan		United Kingdom		United States		U.S.S.R., all
	All	Civilian	All	Civilian	All	Civilian	All	Civilian	All	Civilian	
1961	1.38	0.97	NA	NA	1.39	1.37	2.46	1.48	2.73	1.20	NA
1962	1.46	1.03	1.25	1.14	1.47	1.46	NA	NA	2.73	1.23	2.64
1963	1.55	1.10	1.41	1.26	1.44	1.43	NA	NA	2.87	1.29	2.80
1964	1.81	1.34	1.57	1.38	1.48	1.47	2.29	1.49	2.96	1.31	2.87
1965	2.01	1.37	1.73	1.53	1.54	1.53	NA	NA	2.89	1.33	2.85
1966	2.06	1.40	1.81	1.62	1.48	1.47	2.32	1.58	2.88	1.39	2.88
1967	2.13	1.50	1.97	1.70	1.52	1.49	2.29	1.65	2.89	1.48	2.91
1968	2.08	1.54	1.97	1.72	1.60	1.57	2.25	1.66	2.82	1.46	NA
1969	1.94	1.52	2.05	1.81	1.64	1.61	2.22	1.66	2.72	1.49	3.03
1970	1.91	1.47	2.18	1.96	1.81	1.77	NA	NA	2.63	1.50	3.23
1971	1.90	1.33	2.38	2.16	1.85	1.82	NA	NA	2.48	1.46	3.29
1972	1.86	1.35	2.33	2.13	1.86	1.82	2.05	1.48	2.40	1.44	3.58
1973	1.76	1.30	2.22	2.01	1.90	1.86	NA	NA	2.32	1.43	3.66
1974	1.79	1.36	2.26	2.07	1.97	1.91	NA	NA	2.29	1.49	3.64
1975	1.80	1.39	2.38	2.19	1.96	1.90	2.05	1.38	2.27	1.50	3.69
1976	1.77	1.38	2.29	2.10	1.95	1.89	NA	NA	2.27	1.50	3.55
1977	1.76	1.38	2.31	2.13	1.93	1.87	NA	NA	2.24	1.50	3.46
1978	1.76	1.36	2.31	2.13	1.96	1.90	2.13	1.49	2 24	1.55	3.47
1979	1.81	1.38	2.34	2.16	1.97	NA	NA	NA	2.28	1.59	3.44
1980	1.84	1.35	2.32	2.15	NA	NA	NA	NA	2.37	1.66	3.47
1981	NA	NA	NA	NA	NA	NA	NA	NA	2.39	1.65	NA

NA—Not available.
Figures for U.S. exclude capital expenditure.

Sources: For 1961–66, NSF, "Science Indicators 1980", appendix tables 1–3, 1–4; for 1967–81, NSF, "National Patterns of Science and Technology Resources 1982", tables 17 and 19.

Research expenditure in the other Western industrial economies seems to have been linked to patterns of U.S. expenditure. In the early 1960's, as the fruits of earlier U.S. efforts became visible, considerable concern was expressed in Europe over the "American challenge". During this period, a number of European countries began major programs of R&D investment, particularly in the electronics and aerospace areas, where the American lead was very large and growing. The refusal of the U.S. government to grant an export license for a U.S. computer ordered by the French Atomic Energy Commission in 1966 made the strategic consequences of a technology gap particularly obvious (U.S. Congress, Office of Technology Assessment, 1981).

And so, in the mid-1960's, the French and British governments began a series of interventions in their domestic computer industries, in an attempt to create a strong national industry. The first French "Plan Calcul" dates back to 1967, and large-scale British aid for computer firms starts at roughly the same time. The Concorde supersonic transport was another highly visible product of those times.

Similar developments took place in Japan. Although legislation declaring electronics a strategic industry and authorizing measures to promote it dates back to 1957, large-scale commitment of government funds to its development seems to have only taken place in the 1960's, after a serious threat from newly introduced American computer technology was perceived (Gresser, 1980). A whole series of government-financed technology projects, in electronics, was then launched, and resource commitments to R&D stepped up.

Ironically, then, just as American investment in technology was being deflected by the demands of a war economy, our major industrial competitors were stepping up their efforts in response to a previous generation of American investments.

These developments are reflected in official statistics measuring the levels of resources invested in technology. (See Table 3.) The figures show French and British efforts slowing down, and even declining as a share of national product, as the economic hard times of the 1970's took hold. German and Japanese efforts, however, continue to grow relative to national output, though even these slow down in the late 1970's, and a roughly constant share of GNP plowed back into research as the world economy continued to stagnate.[8]

These ups and downs in technological activism by Western policymakers are reflected in figures on government's role in funding research (see Table 3). Government's share in funding R&D—in the aggregate, and in industry, went into steady decline in France after the mid-'60's, and remained roughly constant in Britain (though support of industrial research declines in the middle years of the 1970's). West Germany, on the other hand, begins its increased sponsorship of research later (the early 1970's), maintains it through the mid-'70's, and only weakens its efforts in the latter years of the decade. Only Japan has a continuous history of stead-

[8] Note that the U.S. figures do not include capital expenditure. NSF estimates indicate that, in the 1970's, these amounted to less than 5 per cent of current R&D expenditure. See NSF (1980), Appendix Table 1-3.

ily increasing government support over the entire period. (Interestingly enough, only a small fraction of this direct support was given directly to firms; the vast majority of the funds went to projects—joint government/industry labs, for example—outside of the business sector, even though, by all accounts, basically commercial technologies were being developed.)

TABLE 4.—COMPARATIVE STATISTICS ON R&D EXPENDITURE, LATE 1970'S

	Year	R&D of GDP	Government of which funded	Enterprise funded	Foreign	Other fund
				Per cent		
Over 2 per cent GDP:						
United States	1979	2.35	50	46	.....	5
Israel	1978	2.42	63	29	.....	8
Japan	1979	2.10	30	70	0.1	.....
West Germany	1977	2.14	43	53	.7	1
Switzerland	1977	2.31	21	77	2	.....
United Kingdom	1975	2.05	52	41	5	3
U.S.S.R.[1]	1979	3.44	.....	.....	.....	.....
Poland	1973	2.72	42	58	.....	.....
Bulgaria	1978	2.23	47	53	.....	.....
Czechoslovakia	1979	3.97	41	59	.....	.....
1.5 to 2 per cent GDP:						
France	1978	1.76	51	44	6	0.3
Netherlands	1978	1.97	48	47	4	.8
Sweden	1977	1.85	38	60	2	.9
1 to 1.5 per cent GDP						
Australia	1976	1.23	73	24	2	1
Belgium	1977	1.38	35	63	.9	2
Canada	1977	1.06	47	32	3	19
Finland	1979	1.08	43	55	.7	1
Norway	1978	1.40	63	33	1	3
0.50 to 1 per cent GDP:						
Austria	1972	0.50	8	90	.5	1
Denmark	1979	.97	53	44	1	1
Ireland	1977	.81	50	33	4	13
Italy	1976	.86	44	51	2	4
Yugoslavia	1977	.85	23	64	1	12
New Zealand	1975	.87	80	19	.....	1
Brazil	1978	.59	31	18	.6	50
South Korea	1979	.59	53	46	2	.....
0.20 to .50 per cent GDP:						
Spain	1974	.74	41	57	2	.1
Ivory Coast	1970	.34	30	14	55	.....
Mexico	1973	.21	62	17	2	19
Peru	1976	.28	67	20	9	4
Philippines	1973	.30	86	13	.8	.....
Argentina[2]	1976	.46	.....	.....	.....	.....
Trinidad[2]	1970	.32	.....	.....	.....	.....
Venezuela[2]	1975	.27	.....	.....	.....	.....
Paraguay[2]	1971	.20	.....	.....	.....	.....
Less than 0.20 per cent GDP:						
Guatemala	1974	.16	61	4	26	10
Colombia	1971	.14	.....	.....	.....	.....
Hong Kong	1973	.06	3	93	3	1
Singapore	1978	.16	38	53	8	.6
Sri Lanka	1975	.17	54	44	2	.....
Panama[2]	1974	.16	.....	.....	.....	.....
Uruguay[2]	1971	.15	.....	.....	.....	.....

[1] Per cent of GNP, from table 3.
[2] Per cent of GNP, from Inter-American Development Bank, "Economic and Social Progress in Latin America 1982," table 72.

All other figures based on R&D expenditure from UNESCO, Yearbook 1981, table 5.6, and GDP from U.N., Yearbook of National Account Statistics 1980."

Definitions of R&D differ somewhat from country to country.

Thus, a complex mix of economic and political rivalry, strategic considerations, and economic stringency appears to have shaped technology policy in Western Europe and the United States over the last 30 years. Only in Japan has there been a steady policy of constantly reinvesting greater and greater shares of national income in technology development. Perhaps the remarkable economic performance of Japan in a floundering world economy ought to be considered a dividend on those years of steadily supporting a more technology-intensive future.

An International Perspective

Other countries have technology policies as well, and it is important to make some assessment of their efforts in developing technology when constructing a more complete picture of the dynamics of international economic competition. Table 4 displays some figures, of highly variable quality, which nevertheless add to our understanding of the international dimension of technology policy. The data generally refer to the late 1970's, and are grouped by level of expenditure on R&D (as a fraction of GDP). The technology superstars—those investing over 2 per cent of GDP in the development of new technology—are a relatively small group. In the Western bloc, the United States, West Germany, Japan, Switzerland, the United Kingdom, and Israel belong. Many of the Warsaw pact countries appear to have even higher relative resource levels going into technology—the Soviet Union, Poland, Bulgaria, and Czechoslovakia are examples.

One might interpret these figures as indicating that quality and organization of research effort, as well as quantity of resources, are important determinants of the outcomes of research, given the lags that the Eastern countries are generally thought to have in key technologies. On the other hand, it is unclear how long these levels of research intensity have persisted, and the manner in which research inputs are priced may lead to grossly misleading international comparisons of resource levels in research (just as different pricing conventions lead to widely divergent estimates of military expenditures).

One also wonders how accurate the depiction of Eastern technology in the popular press is. In the early 1980's, for example, commercial semiconductor production equipment in East Germany was, in certain areas, as sophisticated as commercially available Western technology.[9]

Returning to Table 4, a small group of Western countries ranks just below this first category. In this group, are France, Sweden, and the Netherlands. It is worth noting that countries that one might assume have very high levels of government involvement in the financing of research—in particular, Sweden and Japan—are in fact among the most dependent on financing by the firms themselves.

[9] East German microlithographic semiconductor production equipment was given top ratings in 1982. See Electronics, (April 21, 1982), P. 73.

As might be expected, developing countries generally commit far fewer of their more limited resources to research. The developing countries typically spend about 10 per cent of the GNP share that the most industrialized countries devote to R&D. Two notable exceptions, however, are Brazil and Korea, with spending levels comparable to some of the less wealthy European countries.

The considerable variation in levels of research, as well as the organization of research (note the great diversity in the extent to which government and other non-firm sources fund research, as well as the varying degrees of foreign funds used) lead one to consider in greater detail the precise lines along which technology policy is organized. The United States is an important and interesting case with which to begin.

Technology and Industrial Policy in the United States

Much of the debate on industrial policy currently being heard starts from the premise that the U.S. has essentially no industrial policy. Such a postulate is fundamentally incorrect. While it is true that the U.S. has nothing explicitly labelled industrial policy, military and defense expenditure is a critically important force in technology development in the United States, making the issue a purely semantic one. At the aggregate level, civilian R&D accounts for a smaller fraction of overall R&D expenditure in the U.S. than in any of the other major Western economies (Table 3). Furthermore, the influence of the defense sector pervades the industrial structure, and is not confined to large and costly programs carried out within the military itself. In the late 1970's, 35 per cent of the R&D performed within the domestic U.S. business sector was funded by the government, compared to 25 per cent in France, 2 per cent in Japan, about 30 per cent in Great Britain, and under 20 per cent in West Germany (Table 2).

These aggregate figures showing a large state presence in U.S. R&D, in turn, do not reflect the critical role the military services played in the development of those specific sectors usually labelled as "high-tech". The history of the two most important high-tech industries in the United States today, computers and semiconductors, makes this point quite vividly.

Semiconductor electronics grew out of a massive research program initiated during the Second World War, investigating basic properties of semiconductor materials used in detectors in radar.[10] Researchers at the civilian Bell Labs, building on this research after the war, invented the transistor, which eventually replaced vacuum tubes in amplifier and switching circuits, for reasons of reliability, size, ruggedness, power consumption, and (eventually) cost. All of these conditions (except possibly cost) are of crucial importance in military equipment, and the U.S. military quickly made a commitment to use the new technology in the increasingly ubiquitous electronic circuitry used in its equipment. Even at Bell Labs, the ostensibly civilian technology was heavily influenced by military spending about 25 per cent of their semiconductor re-

[10] Much of the information on the history of semiconductor development given here is drawn from K. Flamm, "Internationalization in Semiconductors," in Grunwald and Flamm (forthcoming).

search, over the 1949–1958 period was funded by the military, and all of the early production of Western Electric (the Bell system's manufacturing subsidiary) went to defense shipments (Higgins, Holbrook, and Emling, 1982; Levin, 1982). Defense Department funds paid for much of industry R&D in the 1950's through direct grants, and through premium prices paid for newly developed componentry. Funds were also channeled to selected firms to build up a production capacity far above prevailing levels of demand.

The next major advance in semiconductor technology, the integrated circuit (multiple circuit components constructed on the surface of a single silicon chip) was invented in 1959. Although the firms which developed the device intentionally avoided military funding for their research, the U.S. Air Force had just began a research program in "molecular electronics" aimed at producing minaturized circuits in a solid block of material, with functional characteristics very similar to those of the new integrated circuits. After the new technology was announced, the military quickly poured new infusions of cash into producers of the devices. Thus, while the basic technology was privately owned, the motivation for developing the new device was the announced goal of the military, and the substantial market for devices with the appropriate characteristics (Asher and Strom, 1977).

Industry spokesmen estimate that the U.S. military ended up paying for roughly half of all R&D done in the semiconductor industry over the period (1958–1969) in which the integrated circuit was developed and brought to the mass market (Linvill and Hogan, 1977; Tilton, 1971; Braun and MacDonald, 1978). The Air Force's decision to use IC's in the Minuteman missile was particularly important: in 1965, these purchases alone accounted for about one fifth of the sales of the industry (Asher and Strom, 1977).

As costs of IC's dropped, commercial applications became more prevalent, and the military market declined from about half of all semiconductor sales in the early 1960's, to roughly 10 per cent of sales in 1981 (Flamm, forthcoming, Table 3.1). These figures are misleading, however, because the largest commercial market for semiconductors is the computer industry, which also grew and flourished in the hothouse of military sales.

In fact, the first modern digital computer (program-controlled, with electronic logic circuitry) was built during World War II, for use in deciphering German code traffic. Full details of the British-built machine remain classified, and it is reported that similar work was underway in the United States, under the auspicies of the U.S. Navy (Tomash, 1980). The first digital computer built in the United States, ENIAC, was also a product of the war, with the calculation of artillery firing tables as its raison d'etre, and the U.S. Army its source of funds (Burks, 1980). Veterans of these programs played key roles in the development of the U.S. and British computer industries (Metropolis, Howlett, and Rota, 1980).

In the United States, the military continued to play a dominant role in the financing of new technology after the war. The services financed the development of a number of major computer projects during the late 1940's and early 1950's, including the IAS computer at Princeton, the ORDVAC and ILLIAC computers at the University of Illinois, the Whirlwind computer at M.I.T. (which was the pro-

totype for a computer-controlled air defense system), the IBM Defense Calculator, and the ERA ATLAS computer. Defense demand continued to finance major computer projects throughout the 1950's, including specialized systems for air defense (the SAGE air defense system), ballistic missile guidance and airborne control (the airborne TRADIC computer, built by Bell Labs, was the first transistorized computer; the ATLAS ICBM guidance computer, built by Burroughs, was the first ground-based computer to use transistors instead of vacuum tubes), and cryptological applications (Warren, McMillan, and Holbrook, 1982; Katz and Phillips, 1982). Military computers became even more important with the increasingly complex weapons systems developed during the 1960's.

The National Security Agency and sister organizations have played a particularly important role in advancing state-of-the-art U.S. computer technology. In 1946, with U.S. Navy patronage, several veterans of the Navy's cryptological agency, including William Norris (who now heads Control Data), started a firm, Engineering Research Associates (ERA), which specialized in the design and manufacture of high speed computing devices for intelligence and defense applications. ERA was later absorbed into Remington Rand, but was of critical importance in the development of high speed computers. Seymour Cray also started in ERA, so that the two U.S. firms which manufacture state-of-the-art supercomputers, Control Data and Cray Research, trace their lineage back to cryptological applications financed by the military (Tomash, 1980). The first Cray-1 supercomputer to roll off the production lines in 1976 went to the National Security Agency (Bamford, 1982).

The NSA supported advanced computer research in many other firms as well. In the late 1950's, Project Lightning, thought to be the largest government backed computer research program in history, was undertaken. One part of that program was the development of the STRETCH computer at IBM, which was directed in 1956 to build the fastest computer possible for a fixed price of $4.3 million.[11] (The second STRETCH was delivered to the Los Alamos labs, to be used in nuclear weapons design and testing.) The key logic circuit used in high performance computer applications was developed by IBM for STRETCH.[12] The NSA continues to be a major customer for high performance computers—its computer facilities are currently said to take up 11 acres (Bamford, 1982).

While Defense Department subsidies to more basic sorts of research appear to have been reduced in the 1970's a major increase in the funding of computer and semiconductor related research took place in the late 1970's. The Very High Speed Integrated Circuit (VHSIC) program, budgeted at $201 million over the five years ending in 1984, recently had its funding increased (by $80 million in 1983 alone) ("Electronics," April 21, 1982, P. 57; USITC, 1979). It was considered so successful that an additional $50 million per year, beginning in 1984, was being requested, and similar research projects in the areas of software, machine intelligence, and ad-

[11] C. Hurd (1980). This figure apparently only refers to production cost, and many times this amount was spent on R&D. See Katz and Phillips (1982), P. 189.

[12] IBM developed emitter-coupled logic (ECL) for the high-speed STRETCH computer project in the late 1950's. See Rymaszewski, Walsh, and Leehan, Pp. 607–8. See also Hurd (1980), P. 414; Bamford (1982), P. 100.

vanced semiconductor materials are under consideration ("Electronics," May 5, 1982, P. 6). Most research into high-speed gallium arsenide integrated circuits in the United States is currently funded by the military (Robinson, 1983). Additional money is funneled into the semiconductor and computer areas under other programs: current examples include the ADA programming language, which will be the standard for all future military applications (the military currently is reported to spend $6 billion annually on software) ("Electronics," November 30, 1982, P. 58); roughly 2/3 of a $5 million microelectronics lab being set up at M.I.T. ("Technology Review," January, 1983, P. A3); a proposed $41 million software engineering institute to be established at a university ("Electronics," November 30, 1982, P. 58).

It is clear that a major new infusion of resources into high technology areas under the direction of the military services is currently under way. The Reagan administration's fiscal 1984 budget called for more than a 14 per cent increase in military spending (for the second year in a row), while spending for civilian technology investment in areas such as space, aeronautics, and science education remained virtually unchanged ("Electronics," February 10, 1983, P. 101).

Not surprisingly, use of military expenditure to subsidize research has been the subject of considerable debate within the electronics industry. There is little doubt that commercially viable technologies have emerged from military research programs. IBM's first generation computers, the 700 series, were commercial improvements on the IBM Defense Calculator (Hurd, 1980). IBM's second generation computers, the 7000 series, used technology developed for the STRETCH computer (Rymaszewski, et al., 1981). The current VHSIC program is already producing commercial applications. Honeywell's new DPS-88 high speed mainframe computer uses packaging technology similar to that developed for its VHSIC circuits, and some of its new high speed logic circuits are direct outgrowths of its VHSIC contracts ("Electronics," November 3, 1982, Pp. 93-95; September 22, 1981, Pp. 89-93; February 10, 1983, P. 175); Texas Instruments is using its VHSIC technology in the 256K memory chips it was scheduled to introduce in 1983 ("Electronics," September 22, 1981, P. 95).

Critics of the militarization of research within the industry instead focus on its efficiency in the production of commercial technologies. For one thing, it commits the industry's capital and human resources in projects not chosen for their commercial potential. Concentration on the military market may also hinder the spread of commercially profitable technology. In the semiconductor industry, for example, the small production runs and extreme quality requirements of military output are sometimes blamed for permitting a Japanese entry into the U.S. semiconductor market. Military specifications required that parts be inspected, tested, and "burned in" by equipment manufacturers, and U.S. producers, with their historical reliance on military markets, used these production methods. The Japanese on the other hand, completely dependent on the commercial market, were free to use entirely statistical approaches to quality control, which concentrated on improving manufacturing processes to the point where defect rates were low

enough to eliminate the need for costly and time-consuming testing and "burn-in" procedures ("Electronics," May 19, 1981, P. 143; August 25, 1982, P. 78). The Japanese were able to parlay an apparent advantage in quality into a significant U.S. market share in the late 1970's.

Another negative effect on technological competence is said to stem from the long development and procurement times that affect military systems. Some systems consequently use technologies that date back 10 or more years, and a producer for the military market may juggle a mix of obsolete technologies and capacity, tying up valuable resources in outdated lines of business ("Electronics," October 25, 1982, Pp. 76–78).

Finally, military direction of research projects has been attacked as a bureaucratic intrusion into a very difficult and specialized management function. As one insider put it: "There are very few research directors anywhere in the world who are really adequate to the job . . . and they are not often career officers in the Army." [13]

Military funding of research, of course, has not been the only active U.S. technology policy. Large amounts of resources have been invested in the educational system, the basic infrastructure of technology. And public funding of university research has been substantial. Still, the fact is that the "high tech" industries in the United States, especially in the electronics area, were very much created and nurtured by the military.

Technology Policy in Europe

European industrial policies that focus on technology have been widely discussed, and a brief review highlights significant differences from the U.S. experience.[14] National policies, while subject to considerable differences from country to country, have certain common features. First, they have generally favored a small number of "national champion" firms, concentrating resources in the chosen few, and not infrequently granting them a privileged position of market power. Second, a protectionist trade policy has been used both as a means of creating market share for the national champion, and as a bargaining chip to force foreign firms to transfer technology through joint ventures in return for market access. Third, while direct subsidies to research were not particularly large in the immediate postwar years, they have become increasingly important. Fourth, military projects are significantly less important to industry than in the United States.

In many respects, West Germany has had the most market-oriented technology policy. Government's share of R&D expenditure, as noted above, is smaller than in any of the other large Western economies, and only 8 per cent of all R&D goes into defense projects (See Table 3). Much of the public money has gone into universities, research institutes, and infrastructural investment. In computers and semiconductors, Siemens has been the major recipient

[13] Robert Noyce, inventor of the integrated circuit, is quoted in Braun and MacDonald (1978), P. 142.

[14] Good descriptions of European industrial policies may be found in Office of Technology Assessment (1981); Baranson and Malmgren (1981); Magaziner and Reich (1982).

of subsidies. Nonetheless, there has been slippage in the technological competitiveness of German electronics firms recently, and Siemens, once the most important European computer firm, now lags behind the French champion, CII-Honeywell Bull, and is closely trailed by British champion ICL, and Italian champion Olivetti in European markets ("New York Times," September 14, 1982, P. D4). Siemens recently concluded a long-term agreement with Dutch Philips, the European firm with the smallest share of the European computer market, to cooperate on microelectronics and information-processing research ("Electronics," December 29, 1982. P. 44).

In many respects, the French have the most visibly interventionist technology policy. A quarter of business R&D is funded by the government; a little under a quarter of all R&D goes into defense (Table 3). "Rationalization" policies concentrate most of those resources in the favored few; CII-Honeywell Bull and Sescosem (the semiconductor subsidiary of the giant Thomsen-CSF electronics group) have been the focus of most electronics research aid. Furthermore, the government exerts significant control over the allocation of loans through the banking system. The French have been particularly aggressive in using preferences in procurement and trade policies to force foreign firms wishing to operate in France to transfer desired technology through joint ventures. Recently announced plans indicate that much greater levels of resources will be injected into selected high-tech firms in the future; the current government plans to invest $20 billion in electronics research over the next 5 years ("Electronics," September 8, 1982, P. 104).

The British have used a set of technology policies that, at least superficially, have resembled those of the U.S. Roughly the same percentage of all R&D is directed into defense projects, and a slightly lower (31% versus 36%) fraction of research carried out by industry is funded by government (Table 2). British aid, however, is said to have been much more oriented toward commercializing existing technology than toward basic research, in marked contrast to efforts in the U.S. and elsewhere in Europe (Baranson and Malmgren, 1981). Rationalization policies have been notably absent from British efforts, and the concentration and reorganization of high-tech firms under government leadership has generally occurred only under conditions of crisis. As a consequence, technology-led industries in the United Kingdom are much more fragmented than elsewhere in Europe. The commitment by the government to support specific industries and firms has also been quite variable as political winds have shifted. In electronics, ICL is the national champion in computers (it is still favored in government procurement, though the government sold its share of the firm in the 1970's; "New York Times," September 14, 1982, P. D4) and Inmos is a government-backed entry in semiconductors. The troubles of technology-based firms in Britain in many respects mirror problems that seem to affect all of British industry, and suggest that the difficulty may not lie in the specifics of government policy, as much as in the general structure of industry.

The European Economic Community, to which all these countries belong, has recently begun a cooperative research program in areas of advanced technology. Pilot programs have been started in microelectronics, software, and automation, and are expected to draw

$300 million to $1 billion in funding over the rest of the 1980's ("Electronics," April 25, 1982, P. 85). The plan calls for cooperation among the major European high-tech firms on basic "precompetitive" research, to avoid costly duplication in national technology development programs. To what extent these efforts will be compatible with the various national technology policies remains to be seen.

Japanese Technology Development

Japanese technology policies, as well as the general Japanese approach to industrial policy have been widely studied (Magaziner and Hout, 1980; Baranson and Malmgren, 1981; U.S. Congress, Office of Technology Assessment, 1981), so this discussion will focus on the main differences that distinguish Japanese guidance of technological investment from policies pursued by other countries. The most striking feature of Japanese policies is the relatively small direct subsidies granted by government to industry. Less than 2 per cent of business R&D was funded by the government in the late 1970's, and roughly 3 per cent of overall research was in the defense sector (Tables 2 and 3). Even in the computer industry, with some of the most extensive government involvement, public funds accounted for less than 6 per cent of R&D in the mid-70's (Magaziner and Hout, 1980).

Instead, public involvement in the development of technology has largely revolved around rather indirect policies that do not show up as budget items. A major mechanism to aid these industries has been capital allocation policies: the government has substantial influence over the loan portfolios of private banks, and has guided capital at below-market rates into favored areas. Implicit guarantees on loans to favored sectors, integral to these capital rationing policies, has further reduced the costs of capital to high-tech firms. An expansionary macro policy, limiting the severity of cyclical swings in demand, has also placed an important role in reducing the risk in high-tech investment (demand for electronic goods, for example, is very sensitive to the business cycle.)

Japan, along with most of the industrial economies, has instituted favorable tax write-offs for R&D expenses, though the Japanese system is not especially generous. In the mid-1970's such tax expenditures amounted to roughly 5 per cent of R&D in the favored computer industry, or about the same magnitude as direct government assistance; in the U.S., by comparison, tax breaks equalled about 4 per cent of R&D performed by all industry.[15]

Competition and rationalization policies have also been a major instrument of Japanese technology policy. Government authorities have repeatedly cartelized the development and production of selected product lines—allocating specific items to particular firms and groups of firms. Examples include cartels formed in computers, computer peripherals, and software. In the semiconductor industry, each of the major firms has a particular area of specialization. When direct subsidization of research has been undertaken, differ-

[15] Magaziner and Hout (1980). For the U.S., calculations are based on Table 2-5, and Appendix Table 2-5, in NSF (1981).

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ent groups of firms are generally selected to specialize in different types of projects. The advantages of these schemes for eliminating wasteful and costly duplication of research are clear.

Substantial control over external flows of technology has been exerted with visible gains. The Japanese market—at least until the liberalization which took place in the late 1970's—was sealed off from foreign imports in areas where authorities wanted to develop a strong national industry. In contrast to European protectionism, Japanese planners made direct foreign investment very difficult, with the explicit intention of forcing the direct transfer of technology through licensing and patent agreements. The bargaining power of Japanese purchasers of technology was increased by forcing all agreements to go through a government-supervised approval process. Japanese firms were often required to share their foreign technology with other Japanese companies. When direct foreign investment was permitted, it generally followed a long and exhausting process of negotiation, and was often allowed only in joint ventures, and only after the foreign investor agreed to share basic patents and technology with Japanese firms. (Both IBM and Texas Instruments were allowed to enter the Japanese market only after consenting to license their key technologies to Japanese firms; Texas Instruments was also forced to agree to an upper limit on its future market share.)

The effect of these policies was to make foreign technology available to Japan without foreign competition in the domestic market, and on very favorable terms. This shows up in U.S. balance of payments statistics; the ratio of receipts of technology-related payments from unaffiliated foreigners (as opposed to U.S. subsidiaries) to total technology receipts is 2 to 5 times greater for Japan than for any other region of the world using U.S. technology.[16]

Finally, the Japanese have invested substantial sums in technological infrastructure. The Japanese educational system is now turning out electrical engineers in greater numbers than the U.S. educational system, though it has roughly half the U.S. population (Kahne, 1981).

In many respects, Japanese technology policies have concentrated resources on commercializing the applications of existing technology. By focussing on indirect transfers of resources to firms—through capital allocation and tax policies, policymakers have permitted firms to select the projects thought to have the greatest commercial potential. Direct subsidies have been used to fund basic research, which has greater risk, less immediate commercial profitability, and greater obstacles to appropriating the results of research investment.

Technology Policy in the Third World

The developing countries have increasingly come to recognize that technological advance is the key to industrial development, and the example of Japan has had a major influence on their technology policies. For a relatively poor country with significant technological retardation, securing technology from more advanced

[16]This statement is based on Appendix Tables 1-20 and 1-21 from NSF (1981).

countries on the best possible terms is the essence of the problem. It makes little sense to reinvent the wheel (with the obvious exception of cases where foreign technologies are ill-suited to local conditions) rather than purchasing the existing technology and improving or building on it.

One approach has been to use centralized control over technology transfer, and payments, to maximize the bargaining position of national firms with respect to foreign vendors of technology. Clearly patterned on the Japanese model, this approach has been especially important in Latin America (with Mexico having what may be the tightest control over the terms on which technology is imported) (Nadal, 1977). There is little evidence on how effective this policy has been, however, and it is difficult to construct a standard against which to measure it.

Another set of policies consists of devising methods of forcing foreign investors to transfer technologies. Content requirements and other performance requirements have often been used for this and other purposes, and have been successful in increasing the complexity of production processess used by foreign subsidiaries, and in forcing foreign investors to supply technical assistance and training to local suppliers. A good example of these types of policies is the recent pact of the Taiwanese government with Toyota to build autos in Taiwan, (even though there is already excess auto production capacity on the island) signed with the explicit objective of gaining access to new technologies ("Wall Street Journal," January 20, 1982, P. 52). These policies have been reasonably successful in large markets, like Mexico and Brazil, but are probably less useful for smaller and poorer countries with less lucrative potential as markets.

Finally, some developing countries recognize that a physical and human infrastructure is required to efficiently absorb transferred technology, as well as to generate indigenous technology. Many countries have science and technology development organizations (CONACYT in Mexico is a good example). Some Asian LDC's are now undertaking major public investments in training and research facilities centered on the electronics industry. Countries which are emulating this aspect of the Japanese model of technological development include Taiwan, South Korea, Singapore, and even (the usually market-oriented) Hong Kong ("Wall Street Journal," January 20, 1983, P. 52; "Electronics," July 14, 1982, Pp. 124–6; June 2, 1982, Pp. 116–20). Unlike the Japanese model, however, they are remaining relatively open to foreign investment. Singapore, in particular, has met with some early success, and has used a variety of innovative policies (including an increase in wage levels to shift its industry mix away from labor-intensive operations, and an ambitious training program) to upgrade its technological base (Hillebrand, et. al., 1981). Still, foreign firms now threatened by Japanese competition are much more wary of selling technology to future competitors, and it remains to be seen whether the Japanese model can be duplicated.

Some Lessons of Historical Experience

There can be little doubt that the Japanese model has been succesful. The numbers are there: in 1955, Japanese receipts from exports of technology amounted to .8 percent of royalties and fees paid on technology imports; by 1960, that figure had risen to 2.4 percent. By the end of that decade the figure was just under 14 percent, in 1974 36 percent, by 1979 55 percent. If, in fact, one counted only agreements contracted in that year, the 1979 ratio would have been 194 percent (Shishido,1983).

Japan's achievement in developing world-class technologies clearly makes it a model for an effective technology policy, emulated by both the less developed economics seeking to catch up to the industrialized economies, and industrial countries striving to retain technological parity. The essential features of the Japanese style of policy include an emphasis on channeling resources into favored sectors through indirect means, leaving favored sectors and firms with the flexibility to decide which projects and approaches are most commercially attractive, a competition policy which cartelizes areas of research investment in order to minimize duplication and maximize learning economies, and direct subsidy of basic research where the commercialization of appropriation of results is difficult, or outcomes are highly uncertain.

The Japanese model is not without weakness, though. It favors applications of existing technologies over basic research, which can create a certain vulnerability to sudden advances in technology. The calculator industry is a good example of this potential weakness. In the early 1970's Japanese firms dominated the industry, specializing in low cost, high volume production. Then, in 1972, U.S. semiconductor firms began marketing calculators based on a wholly new technology, reducing the heart of the device to a single integrated circuit, and reducing the labor and assembly inputs in which the Japanese had been able to reduce their costs to a bare minimum. As a consequence, the Japanese lost their dominance of the market (U.S. Department of Commerce, 1975).

A new technology that is revolutionary enough will always render old methods obsolete, no matter how much is invested in refining them. A similar episode is possible in other markets dominated by Japanese firms. 64K DRAM memory chips, for example, a product in which the Japanese currently hold a lead in global market share, could become obsolete overnight if an order of magnitude improvement in the level of integration on IC's were to be achieved. It is because of this possibility, perhaps, that there seems to be an increasing emphasis on basic research in Japan ("Electronics," August 11, 1982, Pp. 96–7). And American firms, reacting to Japanese competition, increasingly talk of an acceleration in the pace of technological progress as the most effective counterattack against the Japanese strategy of targetting high volume items for product and process improvements.[17]

U.S. technology policy, organized under the aegis of the Department of Defense, has in fact paid for a significant amount of basic

[17] To quote an industry executive: "Innovation is the key. I think what we need to do is to have ways of obsoleting their capacity by the time they move on line." "Electronics," May 19, 1982. P. 139.

research, as well as military applications. It has not, however, been directed at projects selected for economic merit, and therefore has not addressed the principal economic arguments for a technology policy. It has, in at least some cases, been in competition with civilian technologies, and to the extent that it obstructed investment in these areas, been a drain on the economy. Its particular requirements may even have left the civilian businesses of defense contractors with some problems.

European technology policy has relied heavily on pumping subsidies into selected national champion firms, with mixed degrees of success. Unlike Japan, there is a substantial reliance on joint ventures with foreign firms for the acquisition of technology. In spite of its many similarities to the Japanese model, European policies have not created the competition in developing products and cutting costs that the Japanese cartel arrangements have resulted in, since a market is reserved for the national champion, rather than contested by several firms with a comparable technology base. Suppressing nationlist policies within the EEC, and creating a cooperative community-wide research program, as is currently under discussion, may have the effect of rationalizing research expenditure, yet retaining competition in "downstream" products.

In developing countries with the ability to bargain for technology transfer through foreign investment, by imposing performance requirements in exchange for market access, there has been some success in promoting more technologically advanced production arrangements. These policies are limited by the stock of human and capital infrastructure, however, and investment in these areas a requirement for further advance.

Toward a Rational Technology Policy

The theoretical inquiries into the economics of innovation touched upon earlier provide a useful framework for organizing discussion of what a desirable technology policy should do. They also suggest how the efficacy of existing policies affecting investment in technology and technology-intensive sectors ought be judged.

One can start with the resource allocation difficulties identified by Arrow. First, if imperfections in capital markets discourage invention by forcing inventors to bear unwanted risk, mechanisms to socialize this risk can be constructed. This function of a technology policy is likely to be particularly important for big and costly projects, where the scale—and risk to the investor—cannot be limited to desirable levels by scaling down the research effort.

Secondly, the ability of research producers to appropriate the results of their labors can be improved by strengthening the legal protections given them. Patent and copyright policies are one response to this issue,[18] protection of proprietary information and trade secrets are another.

Third, economies of scale in the use of information make some degree of monopoly power in the market for innovations an inevi-

[18] A patent system, in addition to protecting the ability of investors to appropriate their product, grants a monopoly position to the first successful inventor. Strictly speaking, this goes beyond ensuring that inventors can appropriate information they produce, since it proscribes others from acting even if their efforts are totally independent.

table precondition for innovation to occur in a market economy. There would then seem to be two alternatives: policies that remove research from the market, and policies that intervene in research markets to eliminate or reduce the distorting effects of monopoly on resource allocation in these activities.

The most direct program to rationalize research activity would be a scheme that made basic research decisions directly dependent on social return, perhaps with the government directly funding research. The research might be performed by government research labs, private firms, non-profit institutions, or universities. The advantage of such a system is that social, rather than private, profitability would be the criterion for investment, and the results then distributed costlessly to all who might find them useful. At least in theory, (and assuming that social return can be identified-actually an implicit assumption in any technology policy) such institutions can generate an efficient allocation of resources to inventive activity.

The practical problem of running an efficient research program, on the other hand, may argue against such direct control, and the bureaucratization of technology. Yet there is evidence from studies of military R&D that the private sector, when contracted to do research and development for the government, generates plenty of inefficiency and waste on its own (Peck and Scherer, 1962; Marschak, Glennan, and Summers, 1967). Perhaps one reason the Japanese system of joint government/industry research labs seems to do so much with reasonably limited budgets is that the costs are shared. The same logic suggests that the recent movement toward cooperative research arrangements in the electronics industry might make a useful experiment for testing the concept of government funding of a fixed share of costs where such initiatives are in areas of national priority.

Another approach would be to use tax and subsidy policies to align private returns with social benefits. One clear implication of the theoretical literature on research is that such interventions should be targetted, rather than general in nature. Private return can exceed or fall short of social benefit to varying degrees, and subsidies that create further incentives to waste or duplication in a quest for monopoly rents may be counterproductive in some sectors. On the other hand, empirical studies show private return generally understates social return, so a general subsidy to R&D may be a useful second-best measure.

A mechanism to avoid waste would involve cooperative development of technology among user firms. Such a cooperative effort, if undertaken by a non-profit institution (such as a research institute or university) would have the great virtue of encouraging efforts of great value to the industry as a whole, yet preserve the competitive structure of the user industry. Since such ventures would in some respects resemble cartels, supervision by public authority would be proper.

U.S. antitrust policy is now being interpreted in a fashion amenable to such ventures,[19] and U.S. semiconductor firms are press-

[19] The U.S. Justice Department has not objected to cooperative research projects currently going into operation in the semiconductor industry. See "Electronics," January 13, 1983, P. 56.

ing ahead with plans for joint research. Programs sponsored by major firms have already been set up at leading American universities; the Semiconductor Industry Association is establishing a research cooperative to fund university research; 15 U.S. companies are also involved in establishing a for-profit joint research venture ("*Business Week*," April 20, 1981, P. 39; January 10, 1983, Pp. 96–8; "*Electronics*," May 19, 1982, P. 140; September 8, 1982, P. 56).

If public regulation of market structure is chosen as a device to improve resource allocation in important areas of research, regulation may well also be required in industries which use inventive outputs. This is because the economic incentive for the inventor to integrate forward into innovation-using industries can be irresistible. Maximum return to an invention can be extracted only by discriminating in the price charged to different consumers of innovation-using products. Monolpoly in the user industry may be a practical requirement for this sort of power to be exercised. Even more importantly, many inventions are embodied in specific imputs to production, as capital or intermediate goods ("Nordhaus," 1969, Pp. 40–1). This means that (as long as substitution of other inputs for the technology-embodying factors is possible) the technology producer can always increase monopoly profits by integrating vertically with the user industry.[20]

Human resource policy will also be part of an organized attempt to rationalize resource allocation in high technology areas. Skills are a critical ingredient for both invention and the transfer and utilization of technology in a user industry.

A rational technology policy must also be guided by certain strategic considerations. National security may require investments in areas of little commercial value. There may be broad effects on the structure of the economy of concern to public policymakers for reasons of equity, politics, or dynamic considerations too broad to squeeze into the narrow static economic picture painted here.

The models discussed above lack another element critical to discussion of technology policy in the 1980's. Any realistic assessment of the importance of technology must deal with it as a key ingredient in international economic competition.

The International Dimension

While the theoretical literature on the economics of invention is almost exclusively concerned with a closed economy, it is clear that the same issues exist in even more complex form in an open international system. Simply substitute nations for firms and maximize global consumer welfare, and the same logic suggests that intervention—some rules, restraints, or modes of international cooperation—offers the potential for improving the lot of all. Countries, as well as firms, can share the risks of large projects that each individually might be unwilling to undertake. If a nation, like a firm, cannot keep an advantage it creates through investment, it may be reluctant to proceed. And if it can be successful in monopolizing these results, it may be unable to capture the full potential benefit for itself, and perhaps not judge it worthwhile. Or, the results of a

[20] The general argument is made in Vernon and Graham (1971).

technological monopoly may seem so lucrative that it is willing to engage in a wasteful and costly duplication of research already developed elsewhere. Certainly, in a world less full of tension and competition than the one we currently inhabit, the advantages of cooperation in these areas would have an obvious attraction. (To some extent, the relatively free flow of information in the international academic community, less subject to the rule of conserving national advantage—for profit or power—proves this point.)

There is a critical difference, however, when the stories told about a closed economy are rewritten with an international cast. The inventor can now be of a different nationality than the user industry, so national welfare in the user country is no longer necessarily maximized if measures which capture the full benefit of an innovation for the inventor are adopted. If the inventor and users are of different nationalities, then the interaction between the two can be a problem of bilateral monopoly. (Barring state intervention, it is not in a closed economy, because the inventor can freely integrate forward into the user industry if desired.)

It will be a question of bilateral bargaining if a national authority organizes users into a common front, so that a larger part of the rent due to superior technology can be wrested from the inventor, in the pursuit of greater national gains. If there is no domestic user industry, the state can bargain over the terms of entry of the foreign inventor into its market. Even these measures may only partially redress the great inequality in size and monopoly power that a poor and small developing country's industries face when seeking access to modern technology controlled by a large transnational firm.

It is this conflict over bargaining power in access to technology that has currently surfaced in international negotiations over revisions to the Paris Convention, which sets the rules for the international patent system. Developing countries seek easier access (compulsory licensing of "unworked" technologies, which amounts to shorter patent lives on unexploited advances) to foreign technologies, both for the purposes of strengthening their hand in bargaining over terms, and in an effort to prevent "defensive" patents from obstructing their attempts to broaden their indigenous technological base. Firms in developed countries see such changes as amounting to license to expropriate technology at the point of a pen. (Though some in these countries argue that such power in fact already exists, and that such an agreement would regularize the procedures for bargaining.)

Actually, one might argue that a rational compromise position, that addresses the interests of both sides, exists. Students of the economics of a patent system have generally concluded that the optimal patent life-balancing the socially desirable end of encouraging research investment against the resource misallocation associated with monopoly—is shorter, the more important the innovation (the greater the reduction in unit cost for a new process, for example) (Nordhaus, 1969; Scherer, 1980).

Thus, some graduation of patent life with economic importance, with patent life extended further for less important technologies, has an economic rationale. Since less revolutionary advances can presumably command lesser royalty rates, this suggests a classifi-

cation of innovations as major or minor according to the royalty rates the inventor levies. A system in which the inventor announces whether an advance is to be classified as large or small, and where this announcement sets statutory limits on patent life and royalty rates (shorter and higher, respectively, for a major invention), then, would have a number of desirable features. It would further the international objective of encouraging the development and diffusion of new technology in a more efficient manner. It would set a fairly orderly system of rules by which a firm could predict the term and effectiveness of its patent protection as it sets its rates. It would strengthen the bargaining position of the smallest and weakest developing countries, since very high royalty rates would reduce the tenure of the patent.

It is also true that a superior technology will not necessarily improve national welfare if it is purchased from abroad. If the full rent due to better technique is paid out in royalties flowing abroad, and the improvement occurs in an export industry, then adverse shifts in the terms of trade may leave the user country worse off (Brecher, 1982; Bardhan, 1982). The terms on which a new technology can be had will be crucial to the decision to use it.

The existence of a learning curve for technology-intensive goods creates another situation where a nationalistic policy can be advantageous. By reserving local markets for local firms, and possibly by granting monopolies or creating cartels to concentrate production experience in a small number of firms, a country can give its industries an advantage in international competition.

Nationalistic policies can also be applied to the human inputs going into high technology and its user industries. A brain drain can be stopped with exit taxes, or barbed wire.

The problem, ultimately, is that policies that work to any individual country's advantage, if applied by all, leave all at a disadvantage. Reducing the flow of royalties to foreign inventors may, in the long-run, reduce the flow of foreign inventions. If national markets are roped off, learning curves are truncated, and output becomes more costly.

In short, cooperative behavior in an open system, while indeterminate in its distribution of the rewards of technological progress, clearly offers potential benefits to all. The price to be paid is the injection of a global political process into national resource allocation decisions. Nationalistic behavior in a somewhat open system can yield rewards to the nationalist, but at the risk of eventually closing the system down as others retaliate.

The problem is particularly acute for the developing countries. The sluggish world economy of the early 1980's, the consequent slowdown in international trade, and the resulting chronic shortages of foreign exchange, may force these countries into another extended period of import-substituting growth, such as occurred during the World Wars and the Great Depression. Three quarters of a century of import substitution, however, has exhausted the list of less sophisticated goods that are easily produced locally. Further import substitution will require much greater inputs of technological expertise, either purchased abroad or created domestically. Current technology policies in the the Third World generally seem much more oriented toward creating bargaining power in the ac-

quisition of technology from abroad, than toward stimulating and rationalizing indigenous invention. Since resources are especially scarce among the less developed, the possibilities of international cooperation economizing on the use of those resources are especially significant.

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III. TRADE ISSUES IN U.S. INDUSTRIAL POLICY

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Overview

International issues often dominate discussions over how the U.S. government can improve the vitality of American industries. Intensifying foreign competition has prompted the new debate over industrial policy. Many proponents of industrial policy draw their inspiration from policies pursued by foreign governments and warn of serious problems if the U.S. does not follow suit. Opponents belittle the benefits of foreign intervention, doubt the potential for success with the U.S. form of government, and worry about international conflict over industrial policies.

Policy on international economic matters tends to reflect the domestic policy framework. In recent years, the U.S. government has retreated from an activist set of measures for education, training, the environment, workplace safety, antitrust, a stimulative macroeconomic monetary/fiscal mix, and other domestic matters on the grounds that "the private sector knows better" or "would spend the money better." But ironically, the United States has been intervening more regularly in international trade than ever before. Most of these interventions in trade are justified on the grounds that they are offsetting distortions created by the industrial policies of foreign government actions.

This has created an inadvertent, unique blend of industrial policies for the United States: reactive measures in trade and international economic policy combined with heightened laissez-faire policies toward purely domestic product and labor markets. This paper argues that, if anything, the priorities should be the reverse: governmental policies should focus more on restructuring in domestic labor and product markets and use trade policy as one instrument to support that restructuring.

The Historical Backdrop

To a large extent, current U.S. trade problems stem from the past success of U.S. trade policy efforts. Spearheaded by U.S. initiatives, the General Agreement on Tariffs and Trade (GATT) has substantially reduced tariffs on trade imposed by major industrial nations. This has contributed to a remarkable expansion of world manufactures trade from $82 billion in 1963 to $1,049 billion in

*The views expressed in this paper are those of the author, Lee Price, and do not commit the International Union, UAW.

1982, which after adjusting for inflation, represented a 310 per cent increase in volume (GATT, 1983: Appendix Table A1).

In addition to the GATT's role in reducing tariffs, the United States has promoted that institution to discourage industrial policy measures. The U.S. government elaborated its opposition to industrial policy from the lessons it drew from the 1930s—it has believed that most government interventions would not be economically sound, with costs to both the intervening nations and its trading partners. The 1983 "Economic Report of the President" states bluntly that such measures "hurt the country which adopts them as well as other countries" (pp. 60–61) and bring problems for relations between those countries. Thus, American policy has generally viewed industrial policy both as a negative-sum game and as a threat to peaceful international relations.

Two exceptions in U.S. industrial policy contrast with the approach to civilian manufacturing: agricultural and defense-related industries. In these two areas, the U.S. government has set a strongly interventionist example: funding and disseminating advanced research, lending stability to final demand, and even supervising the conditions and location of production. Because of its own policies in these two areas, the United States has been more tolerant of other countries' interventions.

The post-war U.S. orthodoxy is coming under challenge for two reasons: industrial policies appear to be working for major competitors of the United States and current U.S. policy is not producing full employment, growth, and competitiveness for the United States. The experience of Japan and some of the newly industrializing countries (NIC) suggests that intervention can be quite successful in economic terms. Their growth rates for output and for many improvements in standards of living have been without historical precedent.

Equally important, the growing trade difficulties among U.S. manufacturing industries has kindled the debate on the efficacy of industrial policy. With the increasing integration of the world economy in trade and finance, the fortunes of most U.S. industries have become increasingly tied to their competitiveness with foreign manufacturers. The once wide technological edge of many U.S. industries has eroded or been eliminated. As a result, imports represent a rising share of many U.S. product markets and U.S. exports of some products a decreasing share. Many of these industries employ large numbers of workers.

For the first time in the post-war era, the volume of world trade has now declined for two consecutive years. National governments have probably been intervening to restrict imports more than before, but we must look elsewhere to find the major reasons for the decline in trade. The volume of trade depends on healthy and growing national economies, available and affordable international credit, and stable exchange rates. Economies around the world have not experienced such a serious slowdown, such high real interest rates, nor such unstable exchange rates since the Great Depression. To make matters worse, some major national economies reverted to the pre-Keynesian faith that government should abstain from countercyclical stimulus.

On the other side of the equation, the long-term growth of exports has brought many new jobs in the related industries. Export-related jobs have probably increased at a faster rate than those for the economy as a whole. The recent contribution of exports to employment in the manufacturing sector, however, has often been overstated. For example, data for the atypical period 1977 to 1980 are often used to indicate that exports account for most growth in manufacturing production and employment in recent years.[1] As Tables 1-A and 1-B show, exports have indeed grown much more than industrial production since the 1960's, but that the spurt from 1977 to 1980 was exceptional.

The output and jobs tied to exports should be considered over the longer term and in the context of what is happening on the import side. From 1967 to 1980, while exceptional both exports and imports of manufactured goods soared 150 per cent in volume, industrial production grew only 47 per cent. However, over the next 3 years exports plummeted while imports went on climbing. As a result, the volume of U.S. manufactured exports last year dropped below that of 1975, even as imports doubled their 1975 level. Leaving aside the productivity increases that have occurred in the interim, we find that the U.S. had fewer jobs in manufacturing tied to exports in 1983 than it had had 8 years before. The additional imports meant that trade had an even more depressing net effect on total manufacturing employment.

TABLE 1-A. U.S. TRADE AND PRODUCTION OF MANUFACTURED GOODS

[Dollars in billion, current or index 1967 = 100]

	1967	1970	1975	1977	1980	1983
Exports, f.a.s.	20.8	29.3	71.0	80.2	143.9	132.4
Imports, c.i.f.	17.0	27.0	55.0	81.9	131.5	170.6
Trade balance	3.8	2.3	16.0	−1.7	12.4	−38.2
Export volume	100.0	125.3	191.9	193.3	252.7	[1] 191.7
Imports volume	100.0	146.8	154.5	216.7	252.0	[1] 309.4
Industrial production	100.0	107.8	117.8	138.2	147.0	147.7

[1] Average of first three quarters.

Sources: Department of Commerce, Bureau of the Census, and International Trade Administration; Federal Reserve Board.

TABLE 1-B PERCENT CHANGE IN TRADE AND PRODUCTION

	1977-80	1980-83	1975-83
Exports, f.a.s.	79.4	−8.0	86.5
Imports, c.i.f.	60.6	29.7	210.2
Export volume	30.7	−24.1	−0.1
Import volume	16.3	22.8	100.3
Industrial production	6.4	0.5	25.4

Over the long run, the net effect of trade on job creation is problematic. The displacement of jobs due to rising imports may well continue to exceed the new jobs tied to exports. That would occur if, like technological change and skill improvements, trade reduced

[1] E.G., USTR Ambassador William Brock, "eighty percent of new manufacturing jobs" due to exports in recent years, Wall Street Journal, June 21, 1983.

labor requirements for a given level of consumption. This labor saving effect could raise our national standard of living in a dynamic world with buoyant growth of domestic demand and employment, but raise unemployment otherwise.

While macroeconomic policies are the most influential determinants of U.S. employment and competitiveness, this paper addresses questions of trade policy: When and to what purpose should governments intervene in trade? Are U.S. trade laws sufficient to cope with the new problems of the 1980s? Can anything be done to improve the international framework for taking trade-related measures?

Sources of Trade Instability

International trade takes place because of differences in costs in different countries. Some trade has always taken place because different locations possess different natural conditions such as resources or climate. Within the short to medium term, however, almost any traded good or service (or a close substitute) could be produced in any given country, but the costs would vary among them. Therefore, to account for most trade today, one must examine conditions that affect relative costs: equipment in place; technology in use; labor skills available; transportation, communication, and other public infrastructure; labor costs; credit costs; taxes; and political ties to other locations. Unlike resources or climate, these are subject to government intervention to create or maintain competitiveness of its jurisdiction in international markets.

Several developments in the U.S. and world economy in the last decade have had seismic effects on the structure of costs in the international marketplace. These developments have abruptly shifted trade patterns, undermined confidence in the stability of world trade, and aggravated employment problems in the United States and elsewhere. These developments show no sign of abating.

The world trading system has undergone five institutional changes culminating in abrupt changes in the 1970s. First, the demise of fixed exchange rates has been followed by an era of volatile exchange rates. Second, events in oil markets led to a rapid price increase in 1973–74 and 1979–80. Third, competition on the basis of wages has become more prevalent with the equalization of other costs and spread of technology internationally. Fourth, governments have become more competitive in promoting specific industries as they jockey for strategic position in the international division of labor. Finally, transnational enterprises have grown dramatically, raising new institutional problems. The world has had previous experience with erratic exchange rates, steep price increases in key commodities, low-wage competition within major industries, policy-created competitive advantage, and transnational enterprises. However, each has played a qualitatively more significant role in U.S. and world economic developments over the last decade.

Exchange Rates and Volatile Capital Flows

From its inception a decade ago, the system of floating exchange rates has bobbed on some stormy seas. The U.S. dollar, the Japa-

nese yen, and the British pound sterling have experienced particularly volatile swings. As Chart A indicates, the real trade-weighted value of each has, within periods no longer than two years, either risen or fallen over 25 per cent. Such wide swings in a nation's exchange rate directly affect its industries' international competitiveness far more than anything they can do for themselves or traditional trade policy measures can offset. This plays havoc with those industries' decisions about the appropriate competitive response.

Stringent monetary and credit policies of the United States initiated the sharp rise in the dollar in 1980. The widening structural deficit in the Federal budget since 1981 has also contributed to keeping real interest rates high in the United States. As a result, the United States has increasingly become a net exporter of bonds and a greater net importer of goods. The U.S. deficit in merchandise trade widened from $42.7 billion in 1982 to $69.4 billion in 1983 to as much as $115 billion in 1984.[2]

The U.S. manufacturing sector has been particularly hard hit. Between 1980 and 1983, the volume of U.S. manufactured exports have declined 24.1 per cent while manufactured imports have soared 22.8 per cent, as shown in Table 1–B. A $12.4 billion surplus deteriorated to a $38.2 billion deficit, for a total swing of $50.6 billion. That three year swing in the manufactured trade balance represented the equivalent of 4 per cent of U.S. goods production last year.

The sharp rise in the exchange rate of the dollar does not entirely account for the current slide in U.S. trade performance. Slower growth abroad and debt crises in major developing country markets also took their toll on U.S. trade, but they share some of the same origins with the high dollar value. High U.S. real interest rates and the drain of credit from the rest of the world to the United States have raised rates, reduced the credit available abroad, slowed growth, and depreciated currencies. The developing countries have faced weakened export markets, higher interest rates, and much more expensive dollars for debt repayment. Thus, the monetary and fiscal measures to reduce real interest rates would reduce the U.S. trade deficit not only by lowering the exchange rate of the dollar but by improving growth rates abroad and easing the debt servicing burden of developing countries.

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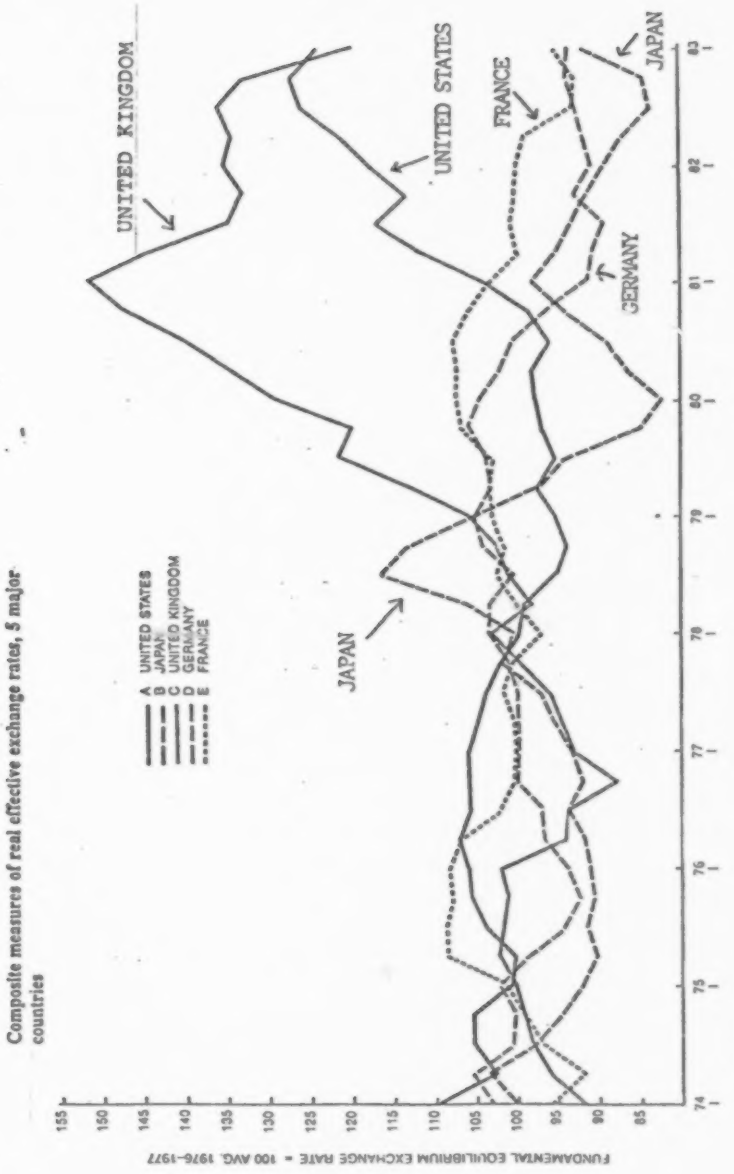
[2] The Council of Economic Advisors predicts such a $45 billion increase in the trade deficit for 1984. "Economic Report of the President, 1984," p. 43.

CHART A



Source:

John Williamson, "The Exchange Rate System," Institute for International Economics, September 1983.

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Oil Prices

As prices for oil and other forms of energy have fluctuated up and down, they have profoundly affected international trade and competitiveness in many industries. Energy costs represent a substantial part of the total costs of many products and of many nations' trade balances. Higher world oil prices changed trade competitiveness and led to trade responses, both in American export industries (e.g., aluminum to Japan, petrochemicals and synthetic fibers to Europe) and import-competing industries (e.g., autos from Japan and steel seamless tube pipe from Europe). As higher oil prices affected trade balances, they put pressure on exchange rates and led to more trade friction between the United States and trading partners. Oil-importing countries like Japan and Brazil scrambled for offsetting exports, while oil-rich United Kingdom and (until recently), Mexico found competitiveness in their non-oil industries eroding and turned to subsidies and other measures to offset that effect. Now, as oil prices decline, the effects are reversed, but no less profound.

Wage-Based Competition

Competition on the basis of wage differentials takes place when the other costs and technology are comparable among the vying locations. This phenomenon is widely recognized for the newly industrializing countries (NICs: e.g., Brazil, Greece, Hong Kong, Mexico, Singapore, South Korea, Spain, and Taiwan) which have experienced growth in output and two-way trade that far exceeds that of the industrial market economies.

Similarly, but less well appreciated, Japan's labor costs remain far lower than those of any other country with comparable sophistication in product and production technology.[2] This has contributed greatly to Japan's striking success in the more technology-intensive industries previously dominated by the high-wage U.S. and northern European countries. As the NICs and Japan have improved their technological capacities but found their export thrusts blunted, they have diversified their production and exports into many new industries. To assist diversification, their governments are taking an active role in underwriting investment risks (potential new barriers to exports are important risks in themselves). Hence, the problem industries for the United States and Europe are multiplying.

Changing Government-Business Relations

Government programs to assist specific industries and locations have a long history. However, competition in international product markets has put governments in competition to promote local production more than ever before. To reduce costs in specific industries, they stimulate investment, support research and development

[2] The Bureau of Labor Statistics has made provisional estimates for the total hourly labor costs for production workers in manufacturing in 1982. With the U.S. labor cost indexed at 100, other advanced industrial countries ranged as follows: Japan—49, United Kingdom—57, Italy—63, France—69, Belgium—75, Australia—77, Sweden—88, Germany—88, and Canada—91. (Bureau of Labor Statistics, 1983).

(R&D), train labor, build infrastructure, moderate wages, and apply a myriad of other measures to affect local costs. They have usually taken these measures more for domestic purposes than for international trade purposes. However, as national economies have become more enmeshed with each other, governments have become even more diligent in reducing specific strategic costs relative to their trading partners. In addition, each nation has become more self-conscious about how to structure its economy to fit into the world economy.

Two types of industry have received the most government assistance in OECD countries. The first type, those with stiff import competition and employment far too large to be moved readily into other production, now includes textiles/apparel, steel, shipbuilding, and automobiles, among others. This category will no doubt expand if unemployment remains high, taking credibility from the argument that "workers can move into other industries." The second type includes those considered "high value-added," i.e., that promise high profits and high wages: segments of electronics, telecommunications, aerospace, and others. The number of industries within this category could eventually shrink if countries do not take cognizance of each other's parallel actions. They may overbuild capacity to the point where some industries would become "low value-added" because of stiff price competition in the marketplace.[3]

Targeting for future development is another form of industrial aid. The main assistance here has been in the form of government coordination and even subsidization of research and development, capital formation, and industrial development strategies. These programs—such as Japanese development of large-scale integrated circuits or French development of telecommunications or the Defense Department's funding of large-scale computer development in the United States—often do not have an immediate impact on trade, but may do so over a longer period. The government role may be negligible by the time the industry becomes internationally competitive and begins to export. Because of the lag in time and change in magnitude between the "targeted" assistance acorn and the mighty oak of foreign competition, U.S. subsidies legislation cannot effectively counter these policies.

Transnational Enterprises

Transnational enterprises (TNEs) have been producing similar products in many countries for a long time. In the early stages of their development, U.S. TNEs generally exported parts for assembly in host countries and imported few products back that were also manufactured here. In recent years, however, more and more TNEs have shifted production abroad and created a global web of integrated production. Their U.S. net positive trade balance has therefore been steadily eroding. These shifts in production location often represent a variant of the two previous items, low-wage competition and competing government policies. However, the TNEs

[3] This point is made in reference to nuclear power equipment by Wolfgang Hager, "Industrial Policy, Trade Policy and European Social Democracy," in John Pinder, editor, "National Industrial Strategies and the World Economy" (London: Croom Helm, Ltd., 1982), p. 252.

deserve separate attention because (1) their transnational status accords them greater bargaining strength vis-a-vis employees and governments since they can threaten to shift more production abroad to get lower wages or more government assistance; (2) their control of marketing channels and technology often gives them autonomy over a considerable range to decide the location of production; and (3) as centralized institutions with intimate knowledge of many national markets, they speed up the flow of production and technology to other countries, accelerating the product cycle from exports to production abroad.

After the experience of the last decade, few would predict long-term stability in exchange rates or oil prices, less foreign competition on the basis of wage differences, reduced intervention by foreign governments to enhance their industries' competitiveness, or a decline in TNE leverage. On the contrary, these were chronic and pervasive structural problems in the 1970s and may continue to be so in the 1980s.

Implications for Macroeconomic Policy, Income Distribution and Employment

These new structural conditions brought on by the deepened ties of the United States to the world economy complicate the management of U.S. macroeconomic policy. First, higher levels of trade reduce the efficacy of demand-oriented policies to stimulate the economy (which U.K. policymakers have recognized for some time). The higher the import share in total demand, the greater the "leakage" when the "pump is primed." In other words, the same increse in demand today brings a lower boost ("macromultiplier") to domestic production than it did when trade was less significant. Moreover, the higher demand for imports causes a shift in the trade balance which may depreciate the currency and spur inflation. The twin problems of reduced macromultiplier and depreciating currency plagued the demand-stimulus effort of the Mitterrand government, increased the appeal of import restrictions in many countries, and encouraged others to promote simultaneous stimuli among the major industrial countries, although slippage in the U.S. trade position has slowed the current recovery,[4] it has not depreciated the currency yet.

Second, Keynes also emphasized the "accelerator" linkage between investment and growth, and the importance of "animal spirits" of persons making decisions for productive investment. Although the effects are difficult to quantify, substantially increased foreign competition has increased the uncertainty of investment decision makers. Their uncertainty has grown not only with the significance of foreign competition, but with volatility of exchange rates.

The expansion of trade also tends to shift the distribution of jobs and income. The international marketplace pits products in compe-

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[4] If U.S. net exports had not deteriorated, other things equal, the U.S. GNP would have had real growth of 7.4 percent for calendar 1983 instead of 6.1 percent, and 6.9 percent for the fourth quarter of 1983 instead of 4.9 percent. (Department of Commerce, Bureau of Economic Analysis, "Gross National Product—Fourth Quarter and Year 1983, Preliminary Estimates," January 20, 1984.)

tition with each other and, at one step removed, the workers who make them. Foreign competition can adversely affect not only those who lose their jobs, but also those who must accept lower pay to keep their jobs. Less skilled workers in industrial countries are finding competitive imports put downward pressure on their wages. By the same token, other workers enjoy upward pressure on their wages when their skills are used in expanding export products. The divergent effect on pay scales of the traded-goods sector spreads to comparably skilled workers in the rest of the economy.

Proponents of expanded trade correctly point out that U.S. products compete successfully in international markets in which extensive skills and advanced technology are crucial. According to standard trade theory, the nation can "gain" from expanding these exports and importing more products made with fewer skilled workers and less standardized technology. However, expanded trade means more U.S. jobs and higher pay for workers with certain skills and fewer U.S. jobs and lower pay for other workers. Recent evidence indicates that income distribution has worsened in the United States, but it is impossible to assess the extent to which trade (as distinct from inflation, slow growth, technological change, demographic changes, and government policy) may have aggravated the situation (Kuttner: 1983).

Finally, the very process of integrating the national economy into the international economy involves increased economic specialization on the part of all national economies. This means that some industries expand in response to new export demand or become more competitive with imports while others contract in response to import competition or loss of export markets. This adjustment and integration process is not smooth or continuous. Moreover, it is frequently coupled with technological change, so that the newly-competitive industries demand higher skills and employ fewer workers relative to new value-added. The net effect of the changes in trade and technology is that many jobs become outmoded and the nation's labor requirements fall (if growth is slow or zero). Moreover, the export industries often grow up in different regions than the industries with declining employment. This makes it all the more important that trade policy be integrated into a broader domestic strategy to restructure industry and labor and pursue rapid growth.

The Foundations of U.S. Trade Policy

U.S. trade policy has historically been founded on two premises that, while not necessarily inconsistent with a self-conscious restructuring strategy, seen to work against the adoption of such programs. First, in U.S. eyes, the objective of international trading rules was the limitation of government interventions and preventing "distortion" of market processes. The U.S.-inspired post-war trading regime codified this principle. Second, the main objective of U.S. trade policy was the offsetting of distortions introduced into trade by other governments. This has resulted in an extensive body of law and litigative procedures designed solely to determine whether foreign governments have violated principles the United States considered to be embodied in the GATT.

However well these premises have served the United States in the past, the events described in the foregoing section limit their usefulness to achieve national goals such as full employment and sustained growth in times of global structural adjustment. It is clear that they need to be supplemented with an approach to trade that integrates U.S. external policy more tightly with American domestic policy. If the general posture of policy is to not intervene in home markets and intervene in tradable goods markets only if other governments do, the government is constrained from adopting policies to promote change at home—and left only with the threat of quasi-protectionist reprisal as the instrument to cope with international economic change. The debate over trade policy quickly is cast then as free trade versus protectionism, rather than as adjusting to economic change. Let us elaborate briefly on the traditional U.S. approach to GATT and to trade intervention.

The United States in the GATT: Proponent of Limited Government

From the earliest post-war negotiations through the GATT Ministerial last fall, the United States has persisted in its efforts to restrict key elements of interventionist policies such as subsidies, government procurement, and restrictions on investment. The GATT was written as a set of provisional rules to backstop the 1947 round of multilateral tariff negotiations. Related negotiations over the International Trade Organization (ITO) charter began the year before and were completed the following year. The GATT rules were initially intended primarily to prevent countries from using non-tariff measures to nullify the effect of their new tariff cuts until the full ITO Charter came into effect. The ITO itself never got off the ground because the U.S. Congress would not agree to join.

The drafting of the GATT rules and the stillbirth of the ITO reflect U.S. efforts and frustrations in reshaping the world to accept minimalist government intervention. When negotiations began for the GATT and the ITO Charter, the United States presented draft documents that formed the basis of discussions. The United States proposed strict rules to limit non-tariff devices that curb imports or promote exports (e.g., subsidies, government procurement, quotas during balance of payments difficulties) with vigorous legal adjudication of alleged violations.

Most of the rest of the world has never accepted the U.S. position on the proper role of government. By the time the final documents were signed, other countries had succeeded in adding or expanding many exceptions to the restraints on government intervention. These exceptions became a focal point for U.S. critics of the ITO. Because of the unwillingness of the U.S. and other governments to surrender sovereignty to an international organization, no effective dispute settlements procedures were adopted. Most disputes that have arisen under the GATT have been resolved by negotiation and compromise, rather than adjudication. This approach has effectively sanctioned many technical violations of the GATT. (Jackson, 1969:35–37 and Dam, 1970:12–16).

The performance of the GATT over the last three decades has far exceeded the role initially expected of it as a mere backstop to the

1947 tariff cuts. However, its role has been far less extensive than that envisioned for the ITO. Under GATT auspices, seven "rounds" of multilateral trade negotiations have been conducted. These negotiations have succeeded in greatly reducing tariffs on manufactured goods among industrialized member countries. In addition, the last two rounds resulted in codes covering non-tariff issues in trade.

Multilateral negotiations have provided a political dynamic that has been conducive to non-discriminatory liberalization. In particular, they mobilize political activity of a broad spectrum of export interests. These groups, in turn, pressure their nation's representatives to negotiate lower foreign tariffs and to accept domestic tariff cuts. Since domestic constituencies measure success in mercantilist terms, a government can justify making tariff "concessions" only by showing foreign tariff reductions for products it exports. With many countries involved, more reductions can be shown to "the folks back home." Lastly, governments more readily accept tariff cuts being applied on a non-discriminatory basis if all their major trading partners are simultaneously reciprocating with a package of comparable cuts. (Each country's package of cuts involves different products.)

The Tokyo Round from 1973 to 1979 marked the first time in GATT's seven rounds of negotiations in which as much attention was devoted to curbing non-tariff barriers as to reducing tariffs. The Round further exemplifies U.S. resistance to industrial policy measures. As its top two priorities, the United States sought "codes" to restrict the use of subsidies and to grant national treatment in government procurement, issues on which it had been forced to compromise when the GATT was first written. Advocates of industrial policy, on the other hand, often recommend using these practices for national advantage.

The Subsidies Code, the highest priority of the United States in the Tokyo Round, prohibits export subsidies on nonprimary products by industrial countries and permits a country to counteract foreign governments' domestic subsidies that have injurious effects. Under the Code, the United States agreed for the first time to require a finding of injury to a U.S. industry before charging countervailing duties on subsidized imports from another country signing the code. So far, the code appears to have had scant effect on the use of either export or domestic subsidies in Europe or less developed countries. The code has, however, provided the United States with justification to take more vigorous action against subsidized imports from those areas.

The Government Procurement Code forbids discrimination against imported goods for contracts over 150,000 Special Drawing Rights (approximately US$196,000) for a set of products and/or government agencies specified by each country. A thorough empirical analysis of the effect of this code has not yet been made. However, the "Economist" recently estimated that imports comprise less than 1 per cent of the purchases of European governments. In addition, the U.S. Trade Representative told the Japanese in February 1983 that the United States was very dissatisfied with Japanese compliance with the code. Thus, the effects of the code are not clear.

One can draw the following conclusion from the U.S. attempts in GATT to negotiate government intervention out of the marketplace: First, GATT has been overwhelmingly successful in reducing tariff barriers to trade in manufactured goods among industrial countries. Second, it has had limited success with nontariff barriers. Third, the new wave of industrial policies and increased business-government coordination falls largely outside the GATT, and for the forseeable future, will remain undisciplined by international accord.

The United States at Home: Defender Against Foreign Governments

U.S. trade officials have shown their antipathy toward industrial policy measures not only in international negotiations but in domestic policy toward imports. The U.S. government far more readily restricts imports to offset some "unfair" foreign action than to relieve domestic injury caused by imports. As a practical matter, industrial policy measures abroad comprise most of the actions that American trade officials consider "unfair."

When the U.S. government intervenes in trade in an attempt to offset foreign government measures, it does so on the grounds that it is defending "free but fair trade." Giving help to the domestic industry may motivate the government, but the overriding public rationale is to make import prices what they hypothetically would have been without specific government interventions.

In recent years, as enforcement of "fair trade" laws against subsidies and other "unfair" practices has expanded, the law to regulate imports solely on the basis of injury to the domestic industry has languished. (Section 201 of the 1974 Trade Act implements the "Escape Clause," Article XIX of the GATT). This is unfortunate—when relief is granted, it should preferably be tailored to the conditions of the domestic industry which Section 201 permits but the fair trade laws do not. Section 201 requires that, before relief is granted, the petitioning industry must submit its plans for adjustment to international competition. Moreover, in theory, Section 201 permits imports to be restrained to the extent and for the period (up to 8 years) necessary to relieve injury. This contrasts with relief under the "fair trade" laws, which make no provision for action to be taken by the domestic industry and for which the degree and duration of restraint is based on the unfair foreign practice.

Petitions for import relief under Section 201 have declined for both legal and political reasons. U.S. law has a tougher legal requirement than the GATT. GATT Article XIX requires only that imports cause "serious injury." However, Section 201 does not permit import relief when the injury from any other source exceeds serious import injury. In the auto case of 1980, it was decided that a general decline in sales constitutes a single source of injury for comparison with injury from increased imports. As a result, the test for Section 201 relief can seldom be proved by a cyclically sensitive industry during a recession.

A major political hurdle confronts an industry that can convince the International Trade Commission (ITC) that it meets the legal standards of Section 201. Even if the ITC recommends that relief

be granted to the petitioning industry, complete discretion rests with the President to decide whether to grant relief and, if so, what form it should take. Tipping the scales against granting relief is the requirement for "compensation" to exporting countries (discussed more fully in the discussion of safeguards below) and diplomatic concerns vis-a-vis those countries. On the other hand, the scales may tip the other way when review by the President occurs in the waning months of his reelection campaign.[5]

In comparison to Section 201, industries have found petitions for relief against subsidized imports far more attractive—particularly since 1979. Once subsidies are shown, the law requires proof of only nominal injury, if at all. Administration discretion not to enforce the law vigorously is seldom if ever, invoked (at least since the Department of Commerce assumed responsibility from the Treasury in 1979). Since the GATT rules do not require compensation for actions against subsidized imports, the Administration has less reluctance to restrict them.

As a result of the 1979 Subsidies Code, U.S. subsidies law now permits a quota to be imposed as a remedy for subsidized imports. Previously, the only available remedy had been countervailing duties (CVD) equal in value to the subsidies. This change laid the basis for the 1982 settlement with the EEC for a two-year restraint of their carbon steel exports. That case highlights the problem of the rise of subsidies law and fall of Section 201. When an unfair foreign subsidy is isolated as causing injury, a CVD seems the appropriate remedy. However, if a quota affecting a third of imports is going to be administered, a thorough examination should be conducted of the domestic industry and of all available remedies, such as Section 201 should be designed to provide.

Section 301 petitions of the USTR represent another increasingly popular avenue against foreign government actions. That section gives the President rather open-ended power to retaliate against vaguely defined "unfair" foreign actions. The many versions of so-called "reciprocity" legislation proposed in the last three years essentially seek to widen the scope and/or increase the leverage of this provision. In practice, the United States tends to consider "unfair" those measures used abroad which are more restrictive of U.S. businesses than U.S. measures. In effect, the United States uses the yardstick of its own domestic measures to judge the validity of foreign measures.

As a practical matter, substantial subsidies and other government interventions have become commonplace for many of our trading partners. Since they seem unlikely to scale these practices back to any significant degree, we can expect many more successful petitions to restrict imports on the basis of "free but fair" trade.

Toward a Comprehensive Trade Policy: The Opportunity Provided by the Safeguards Code

The proposed Safeguards Code offers an opportunity to begin developing some internationally agreed principles that would be ap-

[5] Such thinking apparently led the the recent spate of Section 201 petitions by the steel, copper, and shoe industries.

plicable to national industrial policies. The Safeguards Code would provide rules for imposing import restrictions. The most important issues applicable to industrial policies are the conditions for granting import relief, consultation/treatment of other countries, and transparency with international monitoring of actions taken. Unfortunately, the very troubling conflicts between competitive industrial policies also come on the export side, both into competitors' home markets and into third-country markets. Reaching agreement on policies that promote industries for export go beyond the reach of a Safeguards Code and will prove especially difficult.

The Safeguards Code should include incentives against the imposition of import restraints in the absence of a program for domestic restructuring of the protected industry. That would, of course, entail a shift in U.S. trade policy. In the few times import relief has been granted by the United States, the government has not sought commitments from domestic firms to restructure to achieve improved competitiveness. Too frequently, industries have squandered the respite and additional revenues coming from import relief. For example, during a succession of measures restraining steel imports, the U.S. steel companies have diversified out of steel production and into other industries. Likewise, as primarily small cars from Japan have been limited, U.S. auto companies have shifted out of U.S. small car production and into production and/or importation of small cars abroad.

All significant new restrictions on imports should be accompanied by a careful assessment of the industry's trade difficulties and, unless the problems appear transitory, a plan for restructuring. The assessment should include an inventory of the capacity and key characteristics of all domestic facilities, a comparison of the technology in place with the world's best-practice technology, and an evaluation of all costs of production, including equipment, materials, management staffing, and labor.

The restructuring plan for a protected industry should seek to achieve the benefits otherwise available from open trade, in terms of competitive pressures on product design and cost reduction through production technology, scale economies, etc. Such restructuring may include acquiring, developing, and disseminating best-practice technology, upgrading the skills of workers, phasing out facilities that cannot be renovated, cutting unjustified costs, etc. Where jobs are displaced, workers should be retrained, preferably for jobs in the same vicinity. At the same time, the restructuring effort should promote competition within the domestic industry. In some cases, restructuring might involve an upgrading of some facilities but a gradual scaling back of industry capacity; in others, it might entail maintaining capacity and include some new facilities.

Consultation is a second concern. Countries have legitimate concerns about their trading partners' policies to improve the competitiveness of local industry. This holds true whether the industrial policy at issue tends to counter imports (where the Safeguards Code would apply), to promote exports, or both. When an industrial policy is implemented, other countries with competing industries should have the rights to full information about the extent of government assistance to each industry and to consultation over its effects. If done properly, this kind of exchange can accomplish a

number of positive results. If the two governments better understand each other's problems, they can shape their respective policies to reduce conflicts and ultimately accept the results with less rancor. They can avoid squandering funds on offsetting subsidies. Finally, over time they could learn from each other's experience.

GATT members have honored the applicable "Escape Clause" rules for import relief consultations more in the breach than in practice. According to GATT Article XIX, before a country may raise barriers to imports causing injury, it must consult all countries who are exporting the product to it (except in an emergency). It may "compensate" those exporters by agreeing on reductions of barriers to other products it buys from them. If no agreement is reached, the exporting countries may "retaliate" by raising barriers to imports of comparable value from the non-compensating country within ninety days. In practice, powerful countries have been achieving import relief without paying compensation or suffering retaliation. They have used their leverage to obtain either "voluntary" export restraints or acquiescence to unilateral import barriers.

The leverage to coerce "voluntary" restraints has depended in part on the absence of transparency in obtaining them. Transparency is therefore a third issue. Concerns for the continued favorable treatment of its own exports circumscribes the actions that a country is willing to take against imports. Every government watches the policies taken toward its exports by its trading partners. A country's propensity to shelter its industries can be offset by the fear that such actions would be used to justify foreign actions against its exports. However, if a country can secretly restrain imports, it avoids such inhibitions.

Transparency thus provides a type of disincentive similar to that intended by the Escape Clause's right of retaliation, but not in the same sharp and legal form. Because of the importance and vulnerability of its exports, no country can openly depart very far from the norms of its trading partners in carrying out import relief for its industries.

Transparency is not the rule today. Trading partners regularly uncover secret arrangements by other countries to restrict imports. (Some countries, particularly France and Japan, have often been accused of substantial covert import restrictions.) The absence of transparency arouses suspicion among trading partners and creates an atmosphere in which mutual confidence in the continued openness of trade declines. On the other hand, self-restraint in erecting import barriers would be reinforced by greater transparency, i.e., if countries felt more fully informed about the import restraints of their trading partners.

Negotiations for a Safeguards Code foundered during the Tokyo Round and the 1982 GATT Ministerial has attempted to revive them. Debate has centered on "selectivity"—the restriction of imports from some but not all source countries. Selectivity violates the non-discrimination principle of GATT Article I. Governments have proposed rules that would effectively sanction their own current practices. The European Community wants a sanction to restrict imports on a selective basis unilaterally; the United States also favors selectivity, but on a "consensual basis," i.e., with the

agreement of the exporting country; finally, Japan and the developing countries oppose any code that would sanction discriminatory import restriction since they tend to be the adversely affected exporters in such restrictions.

GATT members could adopt a Safeguards Code that emphasized transparency, but remained silent with respect to selectivity. For the code to have any practical value, it must have the signature of the European Community and the United States, both of whom insist on the freedom to apply selective import restrictions. If the code is silent on selectivity, those who oppose it in the code could continue to resist it. They can argue that, as part of the GATT structure, the code is subject to the nondiscrimination principles of GATT Article 1.

To achieve success with the goal of "transparency," the safeguards code should cover all import restraints—even selective ones,[6] informal ones, and actions against subsidies, dumping, and other "unfair" trade practices. These restraints should be reported to and monitored by the GATT. To work effectively, the code must include some form of sanction for failure to report restraints. Otherwise, countries restraining imports will continue to enforce silence.

Conclusion

The decline in the relative competitiveness of many of its manufacturing industries makes the U.S. government prone to take actions to prop up domestic production in specific industries. Sustained and robust world growth is problematic and could alleviate only some of the problems of specific industries and tensions between countries. Continued problems with exchange rates, energy costs, low-age competition, competitive government intervention, and TNE pressure will make government interventions ever more attractive.

Actions taken at the border that are directed solely at foreign competitors have obvious political appeal. For that reason, restrictive trade measures could become the sum and substance of a future "industrial policy"; this would be most unfortunate. Typically, the economic conditions which compel import restraints also can justify industry- (and even company-) specific intervention to restructure industry capacity with best-practice technology throughout, retrain those workers where there has been outmoded capacity—preferably for jobs at the same location, and attract new industries into regions with a loss of jobs. To achieve these goals for either a growth industry or a distressed industry, merely granting relief from imports (and taxes and regulations) will not suffice. Instead, the U.S. government must, on the one hand, promote restructuring with industry negotiations, possibly accompanied by training, subsidies, government purchases, and regulation of investment. On the other hand, it must seek multilateral rules to regulate industrial policies to avoid injury to trading partners; at the

[6] It could be argued that the GATT structure would effectively be sanctioning selective restraints if it monitors them but takes no action against them but successful transparency would justify such indirect sanction.

same time, the U.S. should pursue international consultations to resolve differences over industrial policies.

The alternative to a recognition on the part of the U.S. government that its trade policy must support a vigorous restructuring effort is to maintain the debate as one of free trade versus protectionism. The choice should not be between "free trade"—i.e., a policy of no government action in trade-related markets—and "protectionism"—simply holding back imports from the U.S. market. This gives threatened workers and businesses no recourse but to choose protection. As it stands, if protection is granted, it is not linked to a program of renewal; the protection either builds a constituency for itself or firms eventually adjust through diversification or captive imports while workers are left to fend for themselves. Ironically, too often the political outcome is protectionism in the name of free trade.

If protection is not granted and serious injury occurs to domestic industry, displaced workers bear the brunt of the adjustment process without recourse to retraining programs or income maintenance programs. Society at large must pay the external costs of unemployment, including the direct costs of unemployment, related taxes forgone and additional benefits paid, as well as the indirect costs of higher rates of suicide, divorce, and violence.

If the build-up of economic pressures is making some form of interventionism almost inevitable, the political consequences for the United States are not at all clear. In response to the economic crisis of the 1930s, fundamental shifts in political structures accompanied the profound change in the relationship between business, labor, and national governments of the United States and Europe. At that time, the United States enjoyed a resurgence of democratic institutions, particularly the organization of workers in the growth industries of the era. On the other hand, Germany and Italy enjoyed some economic success but at a terrible cost in the weakening of their democratic institutions.

Negotiation of international norms to reduce conflicts between national industrial policies must await U.S. recognition of the legitimacy of certain forms of interventionist policies. Until then, negotiations over the Safeguards Code can preliminarily address an important common element: transparency of—and consultation over—the plan of adjustment.

Thus, the U.S. government faces a formidable set of challenges: to strengthen our democratic institutions, to avoid the demagoguery to blaming foreigners for problems that can be resolved domestically, to recognize the efficacy and legitimacy of trade measures as part of an economically sound restructuring policy, and to negotiate agreements to mitigate the international conflicts that arise due to competing industrial policies.

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IV. LABOR MARKET POLICY AND STRUCTURAL ADJUSTMENT

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Major shifts in the industrial structure of employment, sharp employment declines, and rising long-term unemployment suggest that a serious problem of labor dislocation exists in the United States and other developed countries. Research suggests that (1) international trade creates more jobs than it eliminates in U.S. manufacturing, and (2) the current crisis in industries such as steel, auto, textiles, and apparel is due largely to factors other than imports. Nonetheless, expanded international trade exposure has accelerated the rate of change in the composition of U.S. industry, and in so doing, has contributed to adjustment problems in the labor market. Moreover, industries which have the sharpest increases in imports also tend to be those with the greatest problems due to slack aggregate demand, shifts in consumer demand, and technological labor displacement. In a period of slack economic growth and burgeoning unemployment, this correlation between domestic and international problems in U.S. industry has surely contributed to pressures for trade restraint.

In recent decades U.S. labor market policy has significantly diverged from that of our OECD trading partners. While they have made significant progress since the early 1960s in developing and implementing active labor market policy to facilitate labor market adjustment for a broad segment of the labor force, U.S. policy is quite modest by comparison and is entirely geared toward a limited segment of the labor market. The United States is alone among industrial nations in not having developed programs to retrain, relocate, or reemploy members of its experienced, primary-sector labor force who are displaced by economic change. Such a public institutional infrastructure is a basic component of industrial policy as practiced abroad. It also forms an institutional underpinning for successful adjustment to changing patterns of international trade.

The Changing Structure of Employment

The Decline of Industry

Economic displacement of experienced industrial workers is not a new phenomenon. The process of economic growth, technological change, and expanded international trade inevitably produces structural unemployment—that is, a mismatch between the full-employment demand for skills by employers and the supply of skills by workers in local labor markets. During periods of expanding employment, most structurally unemployed workers will even-

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tually be reabsorbed into new employment. The private and social costs of this adjustment, however, can be very great, and the role of public policy is not only to reduce these adjustment costs—a matter of efficiency—but also to spread them in a more equitable manner.

Problems of structural adjustment have become more pressing with the slow economic growth since 1973, as adjustment to higher energy costs has accelerated change in the composition of industry. In the developed nations this has taken the form of an expansion in the high-technology industry, information and communication-oriented industry, and a relative decline of heavy industry such as steel and motor vehicles. In the United States, virtually complete reliance is placed on the labor markets to guide the reabsorption of displaced workers into new employment, or for many, sustained subemployment. In Japan and Europe, market forces are assisted with a variety of public policies designed to assist the expansion of employment in expanding sectors and the redeployment of labor in declining sectors.

In the early 1970s "deindustrialization" accelerated in the United States as well as in other developed nations. From 1960 to 1973, the proportion of the civilian labor force in the United States was a fairly stable 33 per cent (Table 1). A simple trend line fit to this period suggests that industry's share of civilian employment was rising by a slight 0.27 per cent annually. Since 1973, however, the industry employment ratio has fallen sharply. From 1973 to 1981, the annual rate of decline was −.12 per cent. Examination of other major industrial nations suggests that the U.S. experience was not unique; the rate of "deindustrialization" abroad since 1973 seems to be faster. Particularly striking is the experience of Japan, where the industrial employment ratio was rising by .61 per cent annually up to 1973—and falling by .22 per cent annually from 1973 to 1981.

TABLE 1.—THE RELATIVE DECLINE IN INDUSTRIAL EMPLOYMENT

	Percent of civilian employment in industry[1]			Average annual percentage point change		
	1960	1973	1981	1960–73	1973–79	1973–81
United States	33.6	33.2	30.1	.027	−.293	−.278
Japan	28.5	37.2	35.8	.610	−.407	−.220
Germany	48.8	47.5	44.1	−.113	−.468	−.398
United Kingdom	48.8	42.6	36.3	−.486	−.618	−.687
France	37.8	39.7	37.9	.123	−.595	−.405
Sweden	[2] 42.0	36.8	31.3	−.536	−.825	−.780

[1] Industry is defined as mining, manufacturing, utilities, and construction.
[2] 1962.

Source: OECD, "Labor Force Statistics", various issues.

While shifts in the relative composition of the industrial labor force since 1973 have been similar, trends in the level of employment have not. U.S. employment growth has been more robust than that of most of our OECD trading partners (Tables 2 and 3). Total employment in the United States grew by some 18 per cent from 1973 to 1979. Even Japan, the fastest growing of the major industrial economies, experienced only a 6 per cent increase in employment over the same period. This rapid overall growth diffused

to most sectors of the U.S. economy as well. For instance, U.S. manufacturing employment grew by some 4.4 per cent over the period, in sharp contrast to an 11.8 per cent decline in Japan and somewhat smaller declines in Europe.

TABLE 2.—MEDIUM-TERM EMPLOYMENT GROWTH

[1973 = 100]

	Civilian employment	
	Total	Industry [1]
United States:		
1979	116.2	110.2
1981	118.0	107.7
Japan:		
1979	104.2	97.8
1981	106.1	100.7
Germany:		
1979	95.6	90.2
1981	96.0	89.2
United Kingdom:		
1979	100.6	92.4
1981	93.6	79.9
France:		
1979	101.4	92.8
1981	100.7	82.1
Sweden:		
1979	107.8	95.2
1981	108.9	97.2

[1] Industry is defined as mining, manufacturing, utilities, and construction.

Source: OECD. "Labor Force Statistics," various issues.

TABLE 3.—SELECTED EMPLOYMENT WITHIN INDUSTRY

[1973 = 100]

	Wages and salary employment		
	Manufacturing	Textile and apparel	Basic metal
United States:			
1979	104.4	89.1	99.6
1980	100.7	86.3	90.9
Japan:			
1979	88.2	78.8	85.1
1980	89.0	76.4	84.8
Germany:			
1979	92.6	77.7	90.3
1980	93.3	76.5	80.6
United Kingdom:			
1979	91.6	83.3	88.6
1980	86.9	75.7	80.0
France:			
1979	93.8	[1] 87.3	[1] 85.2
1980	92.6	86.0	78.6
Sweden:			
1979	96.6	72.0	95.9
1980	96.3	69.3	95.9

[1] 1975 = 100.

Source: OECD. "Labor Force Statistics," various issues.

Even more striking is the relative stability of U.S. employment in problem industries such as basic metal and textiles and apparel. Employment in the broad textile and apparel industry (ISIC 32*) is seen as the first rung of the comparative advantage ladder in manufacturing. Yet even in 1972 this industry represented 14 per cent of manufacturing employment in the United States and comparable shares in Europe and Japan.[1] U.S. employment in this industry was relatively constant between 1973 and 1979, this in spite of sharp increases in exports by developing countries. Similarly, U.S. employment in the basic metal industry (ISIC 37) grew, in spite of significant increases in steelmaking capacity in various developing countries and a global problem of excess capacity.

Again, U.S. employment experience contrasts sharply with that in Europe and Japan, where reductions in capacity and employment over this same period were the rule. Manufacturing employment declined over this period in Europe and employment in textiles and steel declined at an even faster rate. For the European countries shown, the basic metal sector, primarily iron and steel, declined by 12 per cent over the period. Similar declines occurred in Japan. Employment in textiles and apparel declined 11 per cent by 1979. Japanese employment in basic metal declined even further, falling 15 per cent.

Clearly, a good deal of restructuring was occurring in the industrial composition of the labor force during this period. Although the environment for this restructuring was more favorable in the United States since it occurred in a period of expanding, rather than declining employment, U.S. unemployment rates were higher (Table 4). Many factors play a role in expanding the lower employment rates abroad, but at least some credit must be given to their active labor market policies.

TABLE 4.—ADULT UNEMPLOYMENT RATES [1]

Country	Age 25–64		Age 25+	
	1974	1976	1980	1981
United States	3.8	5.7	5.1	5.4
Japan	1.1	1.6	1.8	2.0
Germany	1.3	3.0	2.4	NA
France	1.9	[2]3.3	NA	NA
Great Britain	2.5	NA	5.0	8.1
Sweden	1.1	.8	1.4	1.8

[1] Adjusted to U.S. labor force concepts.
[2] 25+ years.

Sources: 1974 and 1976, U.S. Department of Labor, Bureau of Labor Statistics, "International Comparisons of Unemployment" Bulletin 1979 (1978) pp. 35–36; 1980 and 1981; U.S. Department of Labor, Bureau of Labor Statistics, "Statistical Supplement to International Comparisons of Unemployment" (June 1982) p. 19.

Regional Imbalances

A more disaggregated picture of structural problems in the United States emerges when we look at the regional patterns of

* ISIC = International System of Industrial Classification.
[1] In 1973, textiles and apparel employment amounted to the following shares of manufacturing employment: Japan (15%); Germany (12%); United Kingdom (16%); Sweden (7%). The 1970 ratio for France was 16%.

employment growth (Table 5). Total manufacturing employment rose by 9 per cent from 1972 to 1979, but in the six major industrial states of the Midwest and Northeast, employment declined by 3 per cent, representing a loss of 90,000 manufacturing jobs. On the other hand, six sunbelt states experienced a 27 per cent increase in manufacturing employment, representing a gain of 927,000 jobs. Thus the overall expansion following the 1973 oil shock masked significant regional shifts in employment and, consequently, potential structural problems in declining regions.

TABLE 5.—REGIONAL SHIFTS IN MANUFACTURING EMPLOYMENT IN THE UNITED STATES

	Employment (1973=100)		Share of U.S. manufacturing employment		
	1979	June 1982	1973	1979	June 1982
Total United States	104	94	100	100	100
5 Declining States [1]	94.7	80.1	35	32	30
5 Expanding States [2]	118.9	117.8	19	21	23

[1] Pennsylvania, Ohio, Michigan, Illinois, and New York.
[2] California, Texas, Florida, North Carolina, and Arizona.

Source: Bureau of Labor Statistics "Employment and Earnings," various issues.

The current recession has exacerbated regional disparities. By summer 1982 a major displacement of the U.S. industrial labor force had occurred in all of the industrial states, but most particularly in the six declining states. Between 1979 and summer 1982, manufacturing employment in the declining regions fell by 15.4 per cent, resulting in a loss of over one million jobs. By summer 1982, the level of manufacturing employment was 83 per cent of its 1972 level. By contrast, manufacturing employment in the six expanding states fell by less than one per cent between 1979 and summer 1982.

Rising Structural Unemployment

Declines in employment do not necessarily represent economic dislocation. Small employment declines may be absorbed through voluntary attrition or retirement. We have no reliable measure for the number of permanently dislocated workers.[2] Indirect measures suggest the number of structurally unemployed is rising. In 1979, 550,000 workers, representing .4 per cent of the U.S. labor force, were unemployed more than six months. By November 1982 the number had risen to over 2.3 million, representing 2.1 per cent of

[2] In the face of apparent widespread labor displacement in U.S. industry, the National Commission for Employment Policy—established in 1974 to formulate U.S. employment and training policy—commissioned a study in 1980 to estimate the true magnitude of the problem. Using the March 1980 Current Population Survey, Bendick and Radlinski (1981) defined a "dislocated worker" variously as a worker unemployed for an extended duration and formerly employed in a declining occupation, industry or region. They concluded that the number of workers was relatively small and consequently that creation of a Federal employment and training program targeting dislocated workers was inappropriate.

Were this study to be redone using a more current data file a different result would surely emerge, since the number of long-term unemployed has risen from 587,000 in March, 1980 to over 2.3 million. A more fundamental problem in using long-term unemployment as an estimate of the number of dislocated workers is the fact that subemployed displaced workers are ignored. For example, an unemployed auto or steel worker—likely to be a family-head—who tends bar two nights a week while seeking permanent work is hardly reabsorbed into the mainstream labor force. A more appropriate measure of dislocation must also count the number of subemployed prime-age workers making this transition to permanent work.

the labor force ("Monthly Labor Review" Vol. 103, No. 4: 74 and Department of Labor).

The secular upward drift in unemployment during the 1970s is more informative than short-term indicators. Each recession during the 1970s to the present has brought higher average rates of unemployment than the preceding recession (Table 6). Similarly, each recovery has failed to fully absorb the rising pool of unemployed. Cyclical peak unemployment is one indicator of rising structural unemployment. Quarterly unemployment at the cyclical peak prior to the 1969/70 recession was 3.4 per cent. Average unemployment rose significantly in each of the subsequent three cyclical peaks, so that before the current recession, unemployment "bottomed out" at 7.4 per cent—well over twice the 1969 level.

TABLE 6.—THE UPWARD DRIFT OF UNEMPLOYMENT

Recession	Unemployment rate			
	Recession average		Previous peak	
	All	Adult male	All	Adult male
1. 1969:IV to 1970:IV	4.7	2.6	3.4	1.7
2. 1973:IV to 1975:I	5.9	3.3	4.8	2.5
3. 1980:I to 1980:III	7.0	4.8	6.0	3.5
4. 1981:III to 1982:IV	9.7	6.7	7.4	4.7
Percent change (1)–(4)	106	158	118	176

Source: Bureau of Labor Statistics. "Labor Force Statistics Derived From the Current Population Survey: A Databook, Volume II" Bulletin 2096. (Sept. 1982); "Employment and Earnings".

Much attention has focused on youth unemployment as a source of this upward drift, but the teenage share of total unemployment fell from 30 per cent in the 1969 peak to 22 per cent in the 1981 peak. The rising structural unemployment stems from rising adult unemployment. Particularly striking is the sharp increase in unemployment among adult males; adult male unemployment at the peak of the last four expansions has risen from 1.7 per cent prior to the 1969/70 recession to 4.7 per cent prior to the current recession—an increase of 176 per cent.

International Trade and Labor Displacement

International trade has affected the labor market in different ways. First, imports have contributed to the dislocation of labor in a number of major industries during the 1970s. Recent studies by Lawrence (1982), Parker and Baldwin (1982), and Krueger (1982) point to major trade impacts in a number of manufacturing industries. For instance, Lawrence attributes 3 percentage points of a 14.1 per cent decline in apparel employment between 1963 and 1980 to increased net imports. Over the same period, net imports contributed 4.3 percentage points to a 19.2 per cent decline in motor vehicle employment. The Parker and Baldwin study highlights the fact that the magnitude of industrial decline which may be anticipated in trade sensitive industries depends on one's assumptions about U.S. and foreign economic growth. A "low growth" assumption for the medium term (i.e., 1.9 per cent in the United States; 2.6 per cent abroad) produces a bleak employment

scenario: employment declines in 102 of 284 industries in their model, provided 1972–79 import penetration rates continue into the 1980s.

It is important to distinguish the sectoral from the aggregate impact of international trade. While import penetration has directly and indirectly reduced employment in a number of manufacturing industries, this has been offset by expanded employment opportunities in industries with positive net exports. For instance, Lawrence finds that a net trade surplus in U.S. manufacturing in 1980 produced a net employment surplus of 310,000 manufacturing jobs. Thus, increased trade exposure in U.S. industry has not produced an aggregate reduction in employment; rather it has accelerated the pace of structural change in U.S. industry. The proportion of the industrial labor deployed in skill- and knowledge-intensive industries has increased more rapidly as a result of expanded international trade. Conversely, expanding trade has accelerated the decline of the unskilled labor-intensive industry.

Unfortunately, the workers in the trade-disrupted industries who must bear most of the adjustment costs are among the least able to do so; the average worker in a trade-sensitive industry is older, less educated, and less skilled than the average manufacturing worker. Moreover, the labor force in trade-disrupted industries contains a higher proportion of workers from poor families, and a higher proportion of minorities and women. The adjustment burden of international trade has largely fallen on the poor families and individuals, and workers with the least flexibility in the labor market (Aho and Orr, 1981).

Active Labor Market Policy

The idea of using employment and training policy to stimulate growth and facilitate structural economic change received considerable attention in the United States and abroad in the early 1960s. Sweden paved the way with an active labor market policy designed to reconcile free collective bargaining with free trade, external balance, full employment, and growth.[3]

There were two basic elements in Swedish post-war growth policy. The first was the Solidarity Wage Policy of the Swedish trade unions. This policy set the rate of productivity growth in the dynamic export sectors as the wage norm for all Swedish industries, including less productive sectors where Sweden's comparative advantage was ebbing. This policy compressed the industry wage structure, reduced wage inequality (hence the "solidarity" dimension of the policy) and contributed to external balance and exchange rate stability (since unit labor costs in the crucial export sector were stabilized). On the other hand, sharp cost pressures were put on sectors with slower rates of technical progress than the leading export sectors. Higher unit labor costs prevented these

[3] A director of the Manpower Office of the OECD in the mid-1960's writes, "The Swedish integrated approach exercised a considerable influence on international thinking in the manpower policy field. It is reflected in the resolutions of the International Labor Conference Resolutions from 1961–64 which they finally adopted, a 'Full Productive and Freely Chosen Employment Policy'. It also contributed to the emphasis upon an 'active policy' system. The 'active manpower policy' formulated in 1964 by the Organization for Economic Cooperation and Development incorporated this point of view." Barkin (1977, p. i).

industries from competing successfully with imports, drained profits, and compelled them to reduce employment.

At this point the second element, an active labor market policy, came into play. Its purpose was to accelerate the reabsorption of labor from declining, low-productivity sectors, and facilitate employment expansion in the more dynamic, higher-productivity sectors—based on the assumption that the faster the structure of employment could be shifted from sunset to sunrise industry, the faster the inequality could be reduced and the rate of economic growth increased. The Swedes developed programs and institutions to retrain, reemploy, and rapidly reabsorb their displaced workers with a minimum of social discord.[4]

The Manpower Directorate of the Organization for Economic Cooperation and Development helped to disseminate and popularize the concept of an active labor market policy. Under the leadership of Gosta Rehn, who was a major contributor to the development of Swedish labor market policy, and Solomon Barkin, an American labor economist, the Manpower Directorate—through scores of reports, seminars and conferences—not only brought about an international cross-pollinization of ideas and research, but also encouraged labor administrators to take a more activist stance in the labor market. In 1965 the Council of the OECD formally recommended a series of manpower reforms clearly emphasizing the link between active labor market policy and liberal trade policy and requiring member countries to report on progress in their implementation.

> The OECD Council's adoption of this recommendation can be regarded as a gentleman's agreement on the part of Member countries to improve their capacity for counteracting employment disturbances in a progressive way rather than by applying restrictive and protective measures through which they try to foist their employment difficulties on to one another (OECD, 1964: 8).

The OECD's emphasis on progressive adjustment policy continues to the present (OECD, 1979).

Training and Adjustment

Vocational training policy is one of the most basic instruments of an active labor market policy. Ideally, such a policy is aimed not only at providing new skills for currently displaced workers, but also upgrading or expanding the skills of workers currently employed in declining sectors who may face displacement at a future date. This anticipated disruption is often a direct result of government policy such as when industry subsidies or various formal or informal import restraints are gradually phased out as part of multilateral trade agreements.

To be successful, the vocational training must impart marketable skills by integrating the training with a general information-gathering and manpower forecasting system in which trends in the supply and demand for various skills are estimated and potential

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[4] For a discussion of the theoretical underpinnings of Swedish labor market policy, see Meidner and Anderson (1973).

shortages noted. Skills in which current shortages exist or are anticipated would be targeted for immediate attention. Obviously such a planning system would benefit both the worker, whose employment prospects are thus maximized, and society, since market adjustment has been accelerated. An active training policy can play a role in macroeconomic stabilization as well as structural adjustment by moderating skill shortages and facilitating market adjustment (Gordon, 1973).

U.S. Policy Since 1962

While U.S. federal manpower training policies date back to World War I, the first major direct federal involvement began in 1962 with the Manpower Development and Training Act (MDTA).[5] A major stimulus for MDTA was the rising level of unemployment during the 1950s. Concern was rising over the displacement of skilled adult workers due to automation. In addition, the impending GATT negotiations on tariff reductions—the so-called "Kennedy Round"—were expected to further exacerbate structural unemployment problems.

Under MDTA, the Labor Department established a variety of institutional vocational training programs aimed at technologically-displaced primary/sector workers. Consistent with this focus on displaced mainstream workers were the initial criteria for entry: enrollment was limited to adult family heads with at least three years of work experience. Training focused on occupations in high demand such as auto repair, welding, machine operation, clerical, and food service. The duration of these programs was typically four to five months (Taggart, 1981).

In the years following 1962, however, the MDTA target population and, indeed, MDTAs raison d'etre changed rapidly. First of all, studies by the Labor Department and a special task force failed to find a major impact of automation on unemployment.[6] More important, however, was the fact that the 1962 tax cut, and later, the Vietnam war buildup, brought about a decrease in the overall unemployment rate and a sharp drop in adult unemployment. As unemployment declined and the fear of technological unemployment diminished, attention began to shift to problems of minority workers in labor markets. The urban riots of the mid-1960s underscored,

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[5] Early employment and training legislation includes: the Fitzgerald Act of 1917, which began the program of federal aid to public vocational education; the Wagner-Peyser Act of 1937 which established a free public employment service; and the Fitzgerald Act of 1937 which began federal monitering, promotion, and financial support for apprenticeship training. Finally, the military has been a source of vocational training in a variety of trades. A recent study estimates that the U.S. military currently provides approximately 4 per cent of aggregate vocational training hours. See Evans (1982, p. 7).

[6] In 1964, congress passed legislation creating a National Commission on Technology, Automation and Economic Progress to examine the social and economic impacts of technological change. The Commission's final report, published in six volumes in 1966, represented a major contribution to the stock of research on U.S. labor markets. Reflecting their generally Keynesian orientation, the Commission concluded that the rising unemployment rates in the 1950's were not due to technical progress per se, but rather to the failure of public authorities to expand aggregate demand sufficiently to absorb the output of the increasing productive industrial labor force. The Commission concludes, "there has not been and there is no evidence that there will be in the decade ahead an acceleration in technological change more rapid than the growth of demand can offset, given adequate public policies." National Commission on Technology, Automation and Economic Progress (1966, p.109).

in particular, the social costs of high rates of minority teenage unemployment.

In the face of the 1960s urban crises, the slim resources of MDTA shifted rapidly toward a new client population: "disadvantaged workers" represented at least two-thirds of MDTA enrollees. As the client population changed, so did the training regime. Resources began to shift from relatively more expensive institutional vocational training to wage subsidies to employers hiring MDTA enrollees, ostensibly to provide training, but perhaps more importantly to take disadvantaged youth off the streets. In its early years, virtually all MDTA enrollees were involved in institutional training programs, but by 1968 one-half of enrollees were in subsidized employment programs.

The declining role of training continued when the various youth job-creation programs which had been implemented during the War on Poverty (e.g., the Job Corps, the Neighborhood Youth Corps) were merged with MDTA programs in 1974 under the Comprehensive Employment and Training Act (CETA). In addition, emphasis in the late 1970s began to shift toward direct federal job creation. The unprecedented severity of the 1974–75 recession led Congress to adopt amendments to CETA to establish a countercyclical public service job creation program. Temporary job creation, rather than training, both institutional and OJT, represented but 16 per cent of CETA expenditures.

By the late 1970s, U.S. manpower policy functioned primarily as income support for disadvantaged workers, who constituted 95 per cent of CETA enrollees, and played virtually no role in assisting dislocated primary-sector workers.[7] There are a variety of reasons for this. First of all, legislative and administrative restrictions, which were tightened in each new authorization round, required that CETA funds go to the neediest and most disadvantaged workers. This meant that for displaced primary-sector workers, the level of prior earnings or current family assets were often sufficient to disqualify them from CETA programs. Second, much of the training provided by CETA was not relevant for experienced private-sector workers (e.g., English language skills, job search methods, "world of work" courses). Finally, many primary sector workers—as well as employers—associated CETA with welfare and thus turned to it only as a last resort.[8]

The ascendancy of public service employment in CETA made it a target of criticism from many conservatives. Consequently, the Reagan administration proposed an alternative, greatly reduced replacement program when CETA's authorization expired in 1982. The compromise bill which emerged from Congress, the Job Train-

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[7] In fiscal year 1980, "disadvantaged workers" constituted 94.5 percent of CETA participants, where "disadvantaged" means: (a) the worker's family receives cash welfare payments; or (b) family income is below the poverty line. "Employment and Training Report of the President," 1981, p. 27.

[8] A recent study of the role of CETA in providing services to non-disadvantaged workers by Barth and Resner (1981) concludes that ". . . CETA legislation precludes sponsors from playing any but a minimal role in assisting non-disadvantaged workers." (p. ES–2).

The authors also conclude that the perception of CETA as a welfare program has been a major problem in eliciting employer participation. A machine-tool industry employer on the Federal Apprenticeship Committee no doubt represented the feelings of many of his peers when he stated "CETA is a welfare program, it is addressed to unemployables . . ." "Industry Week" (Dec. 16, 1981).

ing Partnership Act of 1982, embodies many changes in the administration and operation of employment and training programs, most notably: (a) the transfer of local administration from government to business-dominated Private Industry Councils; (b) the gradual elimination of public-service employment; (c) limits on support available to trainees; and (d) a special program for dislocated workers providing matching federal funds for state retraining programs.

It is too early to tell how this new act will operate. What is clear, however, is that real federal assistance for employment and training programs has been significantly reduced from the levels of the late 1970s (Table 7). Recent budget cuts have, in fact, accelerated a decline that has been under way for over a decade. Real training outlays per unemployed worker fell by 25 per cent between fiscal years 1970 and 1981. By fiscal 1982 they had fallen by one-half again, and preliminary estimates for fiscal 1983 indicate another decline. The federal government was spending nearly four times as much for training per unemployed worker in 1970 as today. Cuts of such a magnitude surely preclude any new initiatives in retraining dislocated workers.

TABLE 7.—SELECTED EMPLOYMENT AND TRAINING EXPENDITURES

Fiscal year	Total outlays (millions)		Real outlays per unemployed worker (1970=100)	
	Training and employment	USES [1]	Training and employment	USES [1]
1970	$1,119	$365	100	100
1979	2,484	745	79	72
1980	3,004	781	68	54
1981	3,902	799	74	46
1982	2,381	731	33	31
1983 (estimate)	2,086	812	26	31

[1] U.S. Employment Service.

Sources: Outlays from the "Budget of the United States", various years. Per worker outlays are deflated by the Consumer Price Index and are in 1970 dollars. "Training and Employment" expenditures are primarily training expenditures, and do not include Public Service Employment outlays. 1983 estimates use average unemployment during the first 5 months of fiscal year 1983.

Active Retraining Policy Abroad

The United States does not currently operate a retraining program for experienced primary-sector workers who are displaced by economic change. The programs which are in place, until recently operating under CETA, are geared almost entirely toward disadvantaged workers. U.S. manpower policy, at least since the mid-1960s, has been oriented toward the most advantaged workers in the labor force. This is in sharp contrast to Europe and Japan, where significant resources are devoted to retraining programs for displaced workers. In countries which operate active industrial policies with respect to "sunset" industries, retraining programs for workers are inevitably part of state-guided restructuring programs.

France inaugurated a major training experiment in 1971 with the Law for Continuous Training committing the government to provide training opportunities to adults as well as youth. The goal

of this program was to provide sufficient training opportunities so that approximately 2 per cent of the labor force could take paid educational leave at any time. Since the programs are less than one year in length, over 3 per cent of the labor force participates every year. Training expenses and stipends are financed by a payroll tax currently averaging 1.2 per cent of payroll. Firms are free to set up their own training programs, subject to approval by the Labor Ministry, to offset all of their tax liabilities (and many large firms seize this opportunity) or the firms can purchase training for their employees from one of the many state vocational training institutes.

A separate National Fund for Employment provides training assistance to currently unemployed workers, and workers threatened with displacement. In addition to educational expenses, workers in training receive a stipend of up to 120 per cent of the minimum wage. Along with these general programs, special retraining programs are a standard part of industry and regional adjustment programs. For instance, three-way negotiations between labor, industry, and the government to reorganize the steel industry in the late 1960s required the steel industry to develop job training and assistance programs for displaced workers as a condition for receiving state adjustment assistance. Similar agreements were reached in the shipbuilding, textile, and clothing industries. Purchasing retraining for redundant employees from the state vocational institutes provided a convenient way for employers to discharge their social responsibilities in these reorganization settlements (GAO, 1979: 57–74 and Sparrow, 1980: 45–50).

Germany reformed and expanded the employment and training system during the 1970s. Beginning with the 1969 Employment Promotion Act and the Vocational Education Act, the operation of employment and training policy became centralized in the Federal Employment Institute, an autonomous public law corporation governed jointly by workers, employers, and German public corporations, which devotes significant resources to retraining displaced workers and upgrading the skills of those currently employed and operates an unemployment insurance system and a public employment service. Between 120,000 and 140,000 workers per year participated in these training programs in the late 1970s, representing from .5 to .7 per cent of the German labor force. Approximately 60 per cent of the trainees were unemployed or under layoff notice.

Workers are referred to training programs through the local offices of the state employment service. Unemployed workers, workers facing imminent dismissal, and workers without vocational skills can qualify. Unemployed trainees receive 80 per cent of their previous gross wages while in training; workers currently employed but undergoing upgrading training receive 58 per cent of their previous gross wage (GAO, 1979: 45–156 and OECD, 1974).

As noted above, Sweden has long maintained a substantial commitment to retraining unemployed workers. These training programs comprise but one part of a comprehensive labor market policy operated through the Labor Market Board, an autonomous state agency whose board of directors is made up of union and management representatives at all levels. Vocational training for workers who are currently unemployed or face dismissal is availa-

ble through public vocational training schools or special subsidized in-plant training curriculum which is jointly determined by labor and management in consultation with the Labor Market Board. Institutional trainees receive a stipend of 155 to 210 kroner per day (the average industrial daily wage in 1980 was approximately 300 kroner); in-plant trainees are paid in accordance with the prevailing collective bargaining agreement. In 1982, 105,000 workers were involved in labor market training programs, representing approximately 2.4 per cent of the Swedish labor force (National Labor Market Board, 1982: 16–17 and GAO, 1979: 107–108).

Manpower training is a vital facet of Japanese industrial policy—a policy aimed at restructuring industry in response to the oil price shocks of the 1970s. The Japanese system comprises two interrelated systems corresponding to the external and internal labor markets. On the one hand, the Japanese have developed a modern and extensive public manpower system operating through over 700 public employment offices around the country geared toward workers not currently in the internal labor market of the large Japanese corporation, e.g., youth seeking initial permanent employment, many women, and workers over the age of 55. The external manpower system does provide training for these workers where it is deemed useful. The major restructuring effort, however, seems to occur within the internal labor market of the enterprise. So important is this internal adjustment process that an OECD examination team characterized the Japanese manpower system as "enterprise-based social policy" (OECD, 1973: 13).

In 1977, the Japanese Ministry for International Trade and Industry (MITI) designated twelve industries for reorganization in light of higher energy prices and world excess capacity. Special worker adjustment programs, including retraining and relocation allowances, extended unemployment benefits, and wage subsidies for employers, are provided to workers and firms in these industries as part of larger restructuring agreements between MITI and the companies involved. Labor and management, however, are given a great deal of flexibility by the government in working out the details of any retraining and relocation programs (Orr, Shimada, and Seike, 1982).

The Public Employment Office

Public employment service plays an important role in the employment and training policy of most industrial nations. In addition to the duties associated with administering a work test in connection with the unemployment insurance system, a duty it performs in most countries, the public employment service often provides a wide range of other services as well. When utilized extensively by employers and workers, it can greatly increase the "transparency" of labor markets, facilitate labor mobility, and provide valuable information about current and future structural problems to policymakers. In the event of layoffs and plant shutdowns, particularly when advance notification is given, the employment service can assist in the reemployment of dislocated workers in the labor market, or by utilizing regional and interregional information on job vacancies, aid in the geographical relocation and

vocational counseling of workers lacking marketable skills or workers seeking to upgrade current skills.

The Shifting Mandate of the U.S. Employment Service

The U.S. federal-state public employment service, established by the Wagner-Peyser Act of 1933, was one of the earliest New Deal labor market programs. Unlike the systems which were to emerge in Europe and Japan after the war, the U.S. Employment Service (USES) was not given a legal monopoly on job referral, nor was it given regulatory powers vis-a-vis competing private agencies, and except for federal contractors, it had no powers to compel employers to utilize its services. Lacking a "stick," the USES had to rely on a "carrot," that is, making their services useful to employers in order to elicit their cooperation.

These weaknesses would not matter in the first decade of operation. In its first years, the primary activity of the USES was to refer needy workers to various New Deal work relief programs. With the passage of the Social Security Act of 1935 and the establishment of the federal-state unemployment insurance system, the duties of the USES were significantly broadened to include administration of the "work test" now required of all unemployment insurance recipients. With the onset of World War II, the USES found itself playing a major role in allocating scarce labor to competing producers of civilian and war goods.

It was not until the end of World War II and the return of higher employment that the problems inherent in a powerless public employment service became visible. The first, and subsequent decades of a the post-war economic expansion saw the proliferation of specialized private employment agencies which skimmed off various segments of the labor market and the easiest-to-place workers, leaving the USES to manage the placement of low-skilled workers into low-wage jobs. Budget cuts during post-war decades further weakened the ability of the USES to compete with private services. This neglect took its toll: in spite of a rapidly growing labor force, the level of USES placements declined.

Despite budget difficulties and a lack of regulatory powers, the employment service did maintain a presence in the labor market for both skilled and unskilled workers. In the late 1960s, however, an explicit policy was adopted to begin to shift resources away from skilled placements toward low-skill labor markets; the primary labor market was abandoned altogether.[9] This change in operating policy, reflected the dominant focus of manpower policy and MDTA programs in operation at the time. In addition, Congress and state legislatures—growing increasingly concerned with welfare abuse—began to use the USES to police public assistance programs in the same manner that they did unemployment insur-

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[9] On the appropriate mandate for the USES, the Assistant Secretary of Labor and Manpower Administrator from 1965 to 1969, writes—

". . . If the ES must continue to provide service to all, it cannot adequately serve the disadvantaged given the present resources or even any conceivable increase in resources.

"As a nation, we have resolved the issue of how 'public' a public service has to be in other areas of social concern. No one questions that publicly supported medical services should be available to those who cannot afford to pay full price—and not to all. There is no reason why we should not be equally selective with regard to employment services." (Ruttenberg and Gutchess, 1970, p. 78).

ance. The inevitable result of such policies was to increase the identification of the USES with welfare in the eyes of employers, who in turn increasingly chose other recruitment means (Table 8).

TABLE 8.—THE DECLINE OF THE U.S. EMPLOYMENT SERVICE

Fiscal year	Nonagricultural placements		Civilian nonagricultural employment (Percent)
	(Thousands)	(Percent)	
1956	6,085	100	100
1960	5,818	96	105
1965	5,902	97	116
1970	4,604	76	131
1975	2,968	49	142
1980	3,827	63	163

Sources: Rottenberg and Gutchess [1970, pp. 70,90]; "Employment and Training Report of the President."

While the USES in recent years has implemented a variety of reforms its role in U.S. labor markets remains marginal. As a result of its limited resources, limited goals, and the narrow range of job listings maintained, the USES has few services to offer displaced mainstream workers.

The Employment Service Abroad

Public employment exchange plays a central role in major OECD labor markets. Their public employment services have an asset which is vital to the success of any employment service: jobs. This is because the public employment service is generally given by law a predominant role in the labor market and extensive regulatory powers over private placement agencies.[10] Employees seeking work are required to register with the employment agency and employers with vacancies generally list them with the public employment service.

Public employment service offices are very useful to workers. First of all, the job information available to job seekers at the agency is extensive since employers generally list vacancies with the public agency. Second, the counseling services of the agencies are very good since emphasis is placed on staff development. Finally, the employment service usually plays a major role in certifying workers' eligibility for the training programs discussed in the previous section. In addition they usually approve relocation and job search assistance for unemployed workers seeking work in another geographical area.

European employers are generally required to give the public labor exchange advance notification of layoffs or plant closings. For example, in the United Kingdom, 60 to 90 days advance notification is required depending on the size of the establishment. In Germany, 30 days notification is required prior to layoffs.[11] This prenotification requirement has enhanced the role of the labor exchange by allowing it to work with the employer and the union or

[10] An OECD study notes that, "Only the United Kingdom and North America are private employment agencies allowed to operate extensively". Levine (1969, p. 13).

[11] A description of prenotification requirements for unions, manpower agencies and workers may be found in Gennard (1979).

works council in developing plans to minimize the disruption and worker hardship and facilitate the re-employment of displaced workers. When workers are under advance notice of dismissal—also a legal right in Europe—they can begin working with employment service personnel prior to their dismissal. A number of European countries even provide workers the legal right to time off with pay to utilize the local employment service once they have received notification of dismissal.[12]

The larger role of the local public employment office in the labor market also provides labor market authorities with valuable information on vacancies and qualifications of registered unemployed. This information is vital in monitoring sources of labor displacement, structural imbalances in the labor market, and in designating appropriate adjustment policy. In this way, local European employment service plays an important role in both the collection and dissemination of information in the labor markets.

Income Maintenance and Adjustment

The unemployment insurance system is the primary means of assisting displaced U.S. workers. This federal-state program currently provides eligible workers with 26 weeks of benefits and an extra 13 weeks of benefits if the local state insured rate exceeds certain benchmarks.[13] Benefits are calculated from the average level of previous wages and duration of previous employment; the formulas vary from state to state, but generally aim at 50 per cent of prior wages, subject to maximum and minimum rates.

Although some critics have argued that the UI payments have contributed to high rates of unemployment in the United States, the U.S. system is not overly generous when compared with some OECD nations. U.S. replacement rates are significantly below those of Japan (62 per cent), Germany (66 per cent), France (69–77 per cent), and Sweden (67–79 per cent). Some countries provide public assistance to long-term unemployed workers who have exhausted their UI benefits. In order to encourage worksharing rather than layoffs, many European countries provide short-time benefits as well.[14]

Unemployment insurance systems are very complicated, and one must be careful in characterizing one system as more liberal than another. For instance, one country may provide a higher fraction of gross wages to recipients but administer its work test in a very strict manner. A general indicator of liberality is provided in the last two columns of Table 9. The level of UI payments as a fraction

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[12] The United Kingdom, Sweden, Spain, Belguim and Italy currently provide workers on notice of layoff with the right to paid leave for job search activities. See "Special Leave Provisions in 10 Countries". "European Industrial Relations Review" 100 (May, 1982), p. 13.

[13] Actually, the maximum duration of benefits is 26 weeks in 45 states. It is greater than 26 weeks in 5 states and the District of Columbia, the longest being Wisconsin (34 weeks). U.S. Department of Labor, Employment and Training Administration, "Comparison of State Unemployment Insurance Laws," (Jan. 3. 1982), Table 309.

During periods of prolonged unemployment, Congress has typically provided supplemental funds from general tax revenues for temporary extended unemployment benefits. The previous session of Congress authorized a temporary 10 week extension of benefits to workers who had exhausted their UI benefits and were still unable to find work.

[14] See Sorrentino (1976). Replacement rates refer to a married manufacturing worker with two children. It includes benefits and family allowances. Of the countries listed, only Sweden taxes its benefits.

of GNP divided by the average unemployment rate provides an estimate of the fraction of the social product which is distributed to the unemployed for each percentage point of unemployment; the larger the fraction redistributed, the more liberal the program. In 1980 other major industrial nations had transfer rates well in excess of the United States—ranging from two to four times the U.S. rate.

TABLE 9.—UNEMPLOYMENT BENEFIT OUTLAYS

	Benefits as a percent of GNP		Benefits as a percent of GNP per percentage point of unemployment	
	1970	1980	1970	1980
United States	0.93	0.64	0.19	0.09
Japan	.27	.33	.25	.20
Germany	.64	1.25	.80	.39
United Kingdom	.55	1.04	.18	.17
France	.14	1.19	.06	.19
Sweden	.26	[1].45	.17	[1].23

[1] 1979.

Source: OECD. "The Challenge of Unemployment: A Report to Labour Ministers." Paris: 1982, p. 143.

The Rise and Fall of Trade Adjustment Assistance

Since 1962, the United States has operated a special compensation program specifically for workers displaced by imports. The United States is currently the only developed nation which attempts to distinguish import-displaced from other displaced workers in its labor market policy.[15] European countries and Japan operate more comprehensive manpower programs for dealing with all displaced workers, regardless of cause.

The Trade Expansion Act of 1962 enabled workers injured by trade liberalization to apply to the U.S. Tariff Commission (the forerunner of today's International Trade Commission) for adjustment assistance. The conditions for receiving support, however, were very stringent. In order to receive assistance it was necessary to demonstrate that: a) imports of the product in question were increasing; b) the increase in imports was caused "in major part" by trade concessions; and c) the increase in imports was "the major cause" of the injury. Workers who met these stringent criteria were entitled to weekly compensation of 65 per cent of their previous weekly wages, or 65 per cent of the average weekly manufacturing wage, whichever was lower, for a maximum of 52 weeks. The combined total of UI payments and the adjustment payment could not exceed 75 per cent of their previous weekly wage. TAA payments, like UI payments, are not subject to income tax. Workers enrolled in approved training programs were allowed an additional 26 weeks of compensation. Special relocation allowances were also available to workers with job offers in another location (Frank, 1979: 40, 44).

[15] Australia experimented with such a program from 1973 to 1976 but did not reauthorize the program. A description of problems with the Australian program may be found in Weisz (1978, p. 213).

The stringent criteria for assistance and their equally stringent application by the Tariff Commission, guaranteed that the number of workers receiving assistance would be small. Also, the requirement that the rise in imports be due to trade concessions meant that no cases were approved for some time after 1962 since the Kennedy Round trade concessions did not take effect until 1968. The Tariff Commission did not approve its first worker petition until November 1969, and from then until the act expired in 1975, the Commission approved only 60 of 231 worker petitions involving a cumulative total of 53,899 workers (Table 10).

TABLE 10.—THE RISE AND FALL OF TRADE READJUSTMENT ASSISTANCE

	Certified		Denied		Total payments (millions)
	Cases	Workers	Cases	Workers	
Trade Expansion Act of 1962:					
1962 to 1975 [1]	60	53,899	171	67,431	$45.3
Trade Act of 1974:					
1975 [2]	121	54,537	111	51,827	50.4
1976	426	142,778	446	64,160	146.9
1977	407	140,518	612	78,577	148.0
1978	806	147,122	1,021	79,231	257.3
1979	781	204,596	1,073	74,292	256.2
1980	891	570,100	1,981	198,973	1,622.2
1981	216	24,124	2,200	247,159	1,440.0
1982 [3]	105	8,669	586	69,151	NA

[1] October 1962 through March 1975.
[2] April through December 1975.
[3] January through June 1982.

Sources: Statistics on 1962 Act from Richardson (1982, p. 328); statistics on 1974 Trade Act supplied by the Office of Trade Adjustment Assistance, U.S. Department of Labor.

The 1974 Trade Act liberalized the program in several ways. First, the criteria used to show import damage were relaxed. No longer was it necessary to prove that an increase in imports was caused by trade concessions; now it was sufficient to show that an increase in imports—whatever the cause—contributed "importantly" to a layoff, even if other factors were a more important source of distress. Second, certification authority was moved from the International Trade Commission to the Labor Department. The latter supposedly would be more flexible and more sensitive to labor problems in their interpretation of the law.

Benefits were also increased under the 1974 Act. Payments increased from 65 to 70 per cent of prior wages. For workers still collecting UI, the maximum combined total payment was now raised from 65 to 100 per cent of the average weekly manufacturing wage. As before, the maximum benefit period remained 52 weeks, with an extra 26 weeks provided for workers in approved training programs. Under the new law, workers 60 years of age and older at the time of layoff were entitled to an extra 26 weeks of benefits as well.

The impact of these changes was immediate. In 1976, the first full year of the Act, 142,778 workers were certified—nearly three times the total number of certifications during the entire twelve years of the 1962 Trade Act (Table 10). The number of certifications rose more or less continuously between 1975 and 1980, ultimately

reaching a peak of 570,100 workers in 1980. Total payments over the same period rose from $146.9 million in 1976 to $1,662.2 million in 1980.

No sooner did these dollars begin to flow than the sharp criticism of the program began. One line of criticism focused on the administration of the program. Although the certification process was somewhat simplified from the 1962 Act, Labor Department staff still had to undertake time-consuming investigations of each application (industry-wide certification, in the manner of the Japanese, for example, was not allowed). In order to establish that imports of the good in question were an "important cause" of the decline in sales, the Labor Department frequently used mail surveys of major customers, adding further to delay in the investigation process. Where one product among many produced by a single company was involved, investigators were forced to make the sometimes impossible determination as to which specific workers were involved. The problems and inequities involved in the often arbitrary certification process were legion.[16]

A more important criticism was that the program was failing in its primary mission—adjustment. First of all, because of the lengthy certification process, well over a year elapsed before a laid-off worker received his or her first TAA payment. A GAO study found that by this time 71 per cent of the recipients were back at work. Thus payments which were meant to help a worker find a job were received after the worker had already done so. Second, only about 25 per cent of TAA recipients were found to be permanently displaced; nearly 60 per cent returned to their former employers (GAO), 1980 and Richardson, 1982: 334).

The minor role of adjustment is also reflected in the types of assistance provided (Table 11). The TAA program was largely geared toward income support rather than active adjustment assistance. Retraining assistance provides a case in point. The 1974 Trade Act specifically authorized the Secretary of Labor to provide training assistance to displaced workers. The Labor Department refused, however, to set up special programs for TAA workers, preferring to rely instead on existing CETA manpower training programs. Since CETA was entirely geared toward disadvantaged workers, this guaranteed that virtually no training service would be provided to the typical TAA recipient (GAO, 1977: 25).

TABLE 11.—ASSISTANCE UNDER THE TRADE ADJUSTMENT ASSISTANCE PROGRAM[1]

Program	Total outlays (millions)	Total workers assisted (thousands)
Compensation	$3,905.2	1,350.2
Job Search	1.8	45.4
Relocation	7.4	4.7
Training	NA	
Entered		48.9
Completed		19.0
Placed		3.7

[1] Cumulative delays, April, 1975 to March 1982.

Source: U.S. Department of Labor, Office of Trade Adjustment Assistance.

[16] An extended discussion of problems involved in determining eligibility may be found in GAO (1977).

A related issue concerns union participation in the TAA program. It is well known that the primary beneficiaries of TAA were union members, no doubt due to the assistance, not available to nonunion workers, of union staff in navigating through the complex certification process. In fact, just two unions—the Autoworkers and the Steelworkers—accounted for nearly 60 per cent of TAA certifications (Table 12). Clearly, a special supplemental UI payment funded out of general revenues for these union members is not likely to find broad political support. Yet few would deny that a structural adjustment problem of major proportions exists for these workers.

TABLE 12.—UNIONS AND TRADE ADJUSTMENT ASSISTANCE [1]

Union	Estimated workers certified		
	Number	Percent of total	Cumulative percent
United Auto Workers (UAW)	629,388	48.6	48.6
Steel Workers (USA)	143,558	11.1	59.7
Amalgamated Clothing and Textile (ACTWU)	63,770	4.9	64.6
International Ladies Garment (ILGWU)	29,336	2.3	66.9

[1] Cumulative total, April 1975 through July 31, 1982.

Source: U.S. Department of Labor, Office of Trade Adjustment Assistance.

This highlights a central dilemma in U.S. policy—in the absence of a federal commitment to develop comprehensive manpower policy and the requisite institutional infrastructure to provide retraining, counseling, placement, and relocation assistance to these workers, the only support government can provide is compensation in the manner of TAA. Yet special compensation for what are preceived as well-paid union members is politically unpopular. Faced with such public policy paralysis, it should come as no surprise that organized primary-sector workers would seek import restrictions in order to protect their jobs and communities.

Given these problems with the TAA program and the eagerness of the Reagan administration and a conservative Congress to reduce entitlement outlays, it is hardly surprising that the TAA program was cut sharply in the fiscal 1982 budget. The 1974 Trade Act was amended to provide that TAA payments would be made only after a worker had exhausted all of his or her UI entitlement and only then up to a maximum of 52 weeks. The maximum benefit was now limited to the previous UI weekly payment. Congress also tightened up eligibility criteria. Benefits are now provided only when imports are a "substantial" cause of unemployment, i.e., imports must be the most important cause of a sales decline and greater than all other causes. The result of these changes is apparent in Table 10. The number of workers certified dropped by 64 per cent from 1980 to 1981, and the 1982 rate will probably be lower.

Since this program was intended to provide assistance to structurally displaced workers, it is important to derive some lessons from its problems. First of all, it is clear that the program failed to provide timely assistance to workers. This was due to the lengthy investigation of each application. One solution to this problem

would be to certify entire industries as trade-impacted, an approach employed in Japan, and to a certain extent, France. Alternatively, special assistance might be provided to all permanently displaced workers, regardless of cause—an approach used in most European countries.

Another facet of the program that made it the target of much criticism was the predominance of compensation rather than other forms of adjustment assistance. The minor role played by the public employment service in the United States, as compared to other countries, makes the minimal use of job search, relocation benefits, and other USES services by TAA recipients understandable. Since the United States operates virtually no training programs for displaced primary-sector workers, it is not surprising that little training took place. Workers can hardly be blamed for failing to use what does not exist.

Conclusions and Policy Recommendations

Structural economic change, which is both a cause and an effect of economic growth and expanded international trade, can impose very great costs on workers and communities. The role of active labor market policy in this area is two-fold: First, it should accelerate the reemployment of displaced workers through various mobility and retraining programs to reduce the social costs. Second, it should help to spread the costs of structural change in a more equitable manner, thereby diffusing political pressures for restrictive industrial and trade policy.

U.S. policy stands in sharp contrast to that of Japan and Europe, where much progress has been made in implementing active labor market policy geared toward structural adjustment for a broad segment of the labor force by developing a coordinated set of labor market institutions to facilitate the retraining and reemployment of displaced workers—a major social investment in reindustrialization. The lack of this investment in the United States helps to explain why programs such as TAA fail to provide labor market adjustment.

General Policy Recommendations

1. *Reverse the Erosion of Labor Market Adjustment Support.*—In 1982 dollars, the federal government spent $34.95 on general employment and training programs, and $11.40 on the Employment Service for each member of the labor force in 1970. By fiscal 1982 this had fallen to $21.61 per worker on training and $8.69 on the Employment Service—real cuts of 38 and 24 per cent. These are the two most basic programs for American workers. Expenditures per worker are significantly lower than most other OECD countries in these areas. Expenditures in Sweden, for example, were approximately four times those in the United States in 1982. If the United States is to develop an effective labor market adjustment policy, this trend must be reversed.

2. *Change the Mandate of Employment and Training Policy.*—The first and most important step in reforming U.S. labor market policy must be to change the self-perceived mission of our public

employment and training institutions in the labor market. Current policy takes a passive orientation toward the labor market and serves only the most disadvantaged workers. What is required is a more activist policy in which structural change is anticipated and a broad segment of the labor force is assisted in adjustment. Without such a change, existing employment and training programs will continue to play only a marginal role in assisting workers in the mainstream of the industrial labor force who face economic hardship as a result of ongoing structural changes in the economy.

Once the self-perceived mission of these agencies changes, scores of changes in administration and operation will follow, the cumulative effect of which will amount to a new direction in U.S. employment and training policy. We do not need a Reconstruction Finance Corporation for the U.S. labor market; rather we need to revitalize, reorient, and coordinate the labor market programs and institutions currently in place.

Some Specific Recommendations

1. *Rebuild the U.S. Employment Service.*—In few areas is the contrast between labor market policy in the United States and other industrial nations sharper than with respect to the public employment service. The public employment service plays a major role in the labor market adjustment policy of other major industrial nations. If the United States is to develop an effective adjustment policy the USES must be revitalized. An expanded USES can play a major role in: (a) improving the labor market matching process, the dissemination of job and training information; (b) monitoring structural imbalances in the labor market for purposes of policy formulation; and (c) testing, counseling, referral, design, and evaluation associated with labor market adjustment programs. The following are some specific reforms to expand the services of the USES and increase its role in the labor market.

(a) *Expand Outreach Activities.*—The USES should be provided the resources to increase its outreach activities to employers and workers. Particular effort should be made to expand and coordinate its placement and guidance efforts with high schools, junior colleges, and private vocational schools. Major efforts should be made to disseminate job market information widely.

(b) *Physically Separate the Employment Service from Unemployment Insurance Offices.*—In an effort to destigmatize the USES and encourage its greater use of workers, both employed and unemployed, and employers, USES offices should be physically separated from UI offices. Consideration should be given to opening USES offices in shopping malls and other areas of significant public traffic. Effort should also be made to improve the physical appearance of the USES.

(c) *Evenings and Weekend Hours.*—The USES should remain open evenings and Saturdays in order to provide services to workers who are currently employed, in training, or seeking employment during daytime business hours.

(d) *Mandatory Listing of Job Vacancies.*—Employers advertising job openings should be required to list these vacancies with the

local job service. At a minimum, the current requirement that federal contractors list vacancies with the USES should be enforced.

(e) *Job Search and Relocation Benefits.*—Employment Service counselors should be provided with adequate resources to assist displaced workers in broadening their job search to other regions when such assistance is deemed appropriate. When a bona fide job offer is available in another location, relocation assistance should be provided.

(f) *Advance Notification of Layoffs and Plant Shutdowns.*—Employers planning plant shutdowns, and temporary or permanent layoffs should be required to provide advance notification to both the affected workers and the local USES office. Employees under notification of layoffs should be provided with reasonable time off with pay to utilize the services of USES.

2. *Retraining.*—While the recent Job Training Partnership Act (JTPA) has performed the useful function of refocusing public policy toward training, many shortcomings remain.

(a) *Stipends for Training.*—The limitations in the JTPA in providing stipends to workers in training programs will prevent many dislocated workers, who might otherwise benefit from training, from participating in such programs. An adequate means- and needs-tested subsistence stipend should be provided to dislocated adults undergoing training.

The "work test" requirements under the current Unemployment Insurance program should be relaxed for workers undergoing retraining. Currently, workers must go through a complicated and intimidating appeals process in order to remain eligible for UI while in training. In effect, the present operation of the UI system impedes, rather than facilitates, worker adjustment through retraining.

(b) *Creative Competition in Training Programs.*—In addition to testing and referring displaced workers to vocational training programs, the local USES can also play a major role in contracting for and evaluating the services of the providers of job training (i.e., public job training centers, junior and technical colleges, and private vocational schools). Creative competition should be encouraged among these providers in awarding training contracts.

(c) *Revitalizing Apprenticeship.*—The new Job Training Partnership Act extends the existing Targeted Jobs Tax Credit (TJTC), which largely subsidizes the employment of disadvantaged youth in low-wage service-sector jobs, to longer term displaced workers. This will provide little help to displaced adult workers unless significant USES staff are provided to actively solicit the participation of new employers and provide referrals of qualified displaced workers.

An additional approach to meeting national human resource needs and facilitating labor market adjustment would be to revitalize the U.S. apprenticeship system.[17] Apprenticeship is a well-established training system which combines classroom vocational instruction with on-the-job training. Moreover, a valuable feature of

[17] In 1977, there were 262,586 registered apprentices in training in the United States, representing 0.3 percent of U.S. civilian employment. In the same year, there were 1,354,367 registered apprentices in Germany representing 5.2 percent of civilian employment. See Koditz (1981, p. 104).

apprenticeship training is the fact that a job is attached to the training process.

The Labor Department and 29 states maintain field staffs of apprenticeship personnel who monitor and solicit employer participation in apprenticeship systems. Field staff have extensive contact with employers and are sensitive to training needs in local industry. Moreover, given the declining number of apprenticeships in traditional fields such as the building trades, field staff have been devoting particular attention to encouraging employers to set up apprenticeship programs in new areas. Of particular interest are new, expanding "high technology" occupations such as computer service repair and electronics technology—areas of reported skills shortages.

A new Apprenticeship Tax Credit should be provided to employers who set up registered apprenticeship programs. Such a tax credit would provide an incentive that state apprenticeship field staff could offer to employers to encourage the development of new apprenticeship programs and the expansion of existing programs. Employers might receive a basic tax credit tied to the wages paid to workers participating in a registered apprenticeship program and a supplemental credit for hiring certified dislocated workers as apprentices. Such a program would help guarantee meaningful and productive training for young, structurally unemployed workers. It would also help satisfy recognized national human resource shortages in various high-demand occupations.

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V. THE ROLE OF ANTITRUST IN THE INDUSTRIAL POLICIES OF THE UNITED STATES

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New international competition and the weakening of the overall U.S. competitive position has given rise to calls for dilution or elimination of U.S. antitrust laws. The assertion that these laws put American corporations at a disadvantage in competing with foreign-based companies is not new, but the argument has become more persuasive as Japanese and Western European firms have gradually become more effective competitors for American as well as foreign markets. Clearly, U.S. antitrust laws "shackle" U.S. companies in prohibiting them from participating in cartels. Whether the inability legally to participate in arrangements to divide and share markets reduces a company's ability to compete is another matter.

The antitrust laws, however, have come under heavy attack. If, it is asked, international trade now provides foreign competition to U.S. industry in almost all product lines, including those of most concentrated industries, why do we need antitrust? More important, it is argued that our industries would be more competitive with foreign firms if they could have trading companies, engage in joint R&D, price collectively or share bids—all behavior inhibited by risk of antitrust prosecution or private treble damage suits. Much of the recent industrial policy literature calls for a closer government, business, and labor-collaboration to enhance American competitiveness with rival nations in the world economy. A positive role for government is visualized not in maintaining a legal framework within which competition takes place but in planning and supporting strategic decisions in such areas as investment, technological development, and trade.

The general perception that the new interdependence increases competition domestically and permits, or even requires, the abandonment of the U.S. antitrust policy is not shared by all. Corwin Edwards (1979: 285–299) has pointed out that other, offsetting changes in the organization of international business may require stronger, not weaker, antitrust. He noted six important changes: (1) Because the territorial scope of big firms has grown larger, they encounter different competitors, different customers, and different suppliers in various markets; (2) The number and variety of products produced and sold by large enterprises have increased with their size so that the largest enterprises encounter the most diverse groups of competitors, customers and suppliers; (3) Increased vertical integration gives the large firms opportunities to act at each level of activity differently from their nonintegrated competitors at

each level; (4) As a result of these three types of changes, the largest enterprises have an amount and variety of resources useful in more than one market and shiftable from market to market greater than smaller firms over whom they can thus exert power; (5) The big diversified, vertically-integrated enterprises have developed internal management structures that limit internal conflicts of interest and make their behavior in each market serve the interests of the enterprise as a whole. Thus, conduct by the giant enterprise is less responsive to both opportunities and the curbs of law and competition in particular markets; and (6) The larger enterprises are no longer organized as a single corporation chartered by a single state but are now likely to be a corporate combine consisting of many corporations organized under different charters possibly granted by different states or nations. Corporate units in such a combination relate to each other in complex ways that afford opportunities to take advantage of differences in the relevant laws of different states or nations.

Nonetheless, at no time since the great Depression has the domestic anti-antitrust sentiment been stronger. On the one hand, the Reagan adminstration has scaled back its enforcement of antitrust. On the other, Congress recently passed the Export Trading Company Act with substantial changes in antitrust law, which apparently weaken restrictions on international cartel behavior. ("Antitrust & Trade Regulation Report", Oct. 1982: 693–5.)

This article explores the relationship between competition policy, international competitiveness, and industrial policy. Are U.S. firms at a competitive disadvantage vis-a-vis foreign companies? What would be the consequences of abandoning antitrust on U.S. international competition and on developing countries? Is the best policy to abandon antitrust and to permit U.S. firms to compete collectively? Or should the United States try to establish an international accord on harmonizing antitrust measures, perhaps bringing under its auspices a new array of restrictive business practices that new business conditions warrant?

International Competition and New Arguments To Abandon Antitrust

Changes in the structure of the international economy during the post-war years have aggressively decreased the adequacy of existing antitrust laws as the cornerstone of industrial policies. Several significant changes have occurred. The dominant corporations within the United States have become increasingly multinational, thus becoming more and more interrelated with each other and with foreign-based multinationals in legal jurisdictions other than the United States. In most other OECD countries the participation of national governments in business decision making, including government ownership, has increased. Trade between the market economies and the centrally planned economies has opened up. Furthermore, antitrust policy has given way to other industrial policies—in Japan the occupation-imposed policies have been relaxed and in the European Coal and Steel Community, in which the "crisis" provisions of the Treaty of Paris have been invoked on a continuing basis since 1974. Most important, perhaps, the growth

of U.S. exports and imports has placed a growing portion of our economic activity under the control of decision makers beyond the effective reach of U.S. law.

From the very enactment of the Sherman Act opposition to the law has come from those with vested interests directly affected by its application. Given the immense political power of such interests, including much of the leadership of both big business and organized labor, the survival of the policy, albeit seldom in full flower, is evidence of the grass-roots support for social control of restrictive business practices.

Support for the antitrust policy traditionally has come from conservative advocates of laissez-faire and free trade as well as from populist advocates of positive governmental programs to protect the people from powerful economic interests. Such free market advocates as Chicago's Henry Simons saw the need for positive government action to maintain competition in the face of the obvious incentives for businessmen to collude or merge. The current wave of anti-antitrust sentiment is particularly significant because conservative advocates of laissez-faire, under the leadership of the "New Chicago School" have joined forces with the vested interests in attacking antitrust as unwarranted interference with market processes. That view seems to rest on the assumption that markets are "natural" and require no legal framework (Martin, 1976). Arguments against antitrust are now being made not only by laissez-faire advocates but also by liberal advocates of industrial policy. Lester C. Thurow, a prominent MIT economist has been widely quoted in the popular press for his criticism of U.S. antitrust policy ("Business Week," 1979, 1981; "Dun's Review", 1981). Thurow's arguments on the surface appear quite persuasive. Like the more conservative opponents of antitrust, he makes no argument against competition. His criticism is of the cost, ineffectiveness, and unnecessariness of domestic antitrust laws in today's world. He says (Thurow, 1980):

> If we are to establish a competitive economy within a framework of international trade and international competition, it is time to recognize that the techniques of the nineteenth century are not applicable in getting ready for the twenty-first century. The late nineteenth and early twentieth centuries witnessed a two-pronged effort to create and maintain competitive capitalism. Antitrust laws were developed to break up man-made monopolies, and regulations were developed to make natural monopolies act as if they were competitive. While both of these approaches have had their problems, the time has come to recognize that the antitrust approach has been a failure. The costs it imposes far exceed any benefits it brings.

Thurow's cost-benefit analysis warrants careful critique. His arguments on the "futility and obsolescence" of U.S. antitrust laws are organized around five points: (1) the consequences of international trade, (2) the market definitions used in antitrust cases, (3) the conglomerate movement, (4) the innocuous remedies usually achieved in antitrust cases, and (5) the consequences of non-price competition. Because Thurow's concept of competition comes

through in his discussion of the last four points, let us consider them briefly before turning to the all important question whether increasing international interdependence makes the antitrust law policy obsolete.

The market definition issue has come to be a key question in most, but not all, antitrust cases. The Sherman Act prohibits monopolization and attempts to monopolize any part of the commerce among the states or with foreign nations. The Clayton Act prohibits competition-lessening mergers in any line of commerce. The plaintiff bears the burden of specifying precisely just what part of commerce is adversely affected by defendants' actions. If markets are defined very narrowly, then a horizontal merger appears to be conglomerate with no direct effect on market structure in any market. On the other hand, in a monopolization case a broad definition means that monopoly does not exist. Lawyers for defendants use the obvious tactic of trying to define away the plaintiff's case. Judges and juries have the difficult task of sifting the evidence and ascertaining what really is going on in the real world. On this complex issue Thurow comes down essentially on the side of defendants in monopolization cases—everything competes with something else in the affluent society, so significant monopoly power is impossible. He illustrates his point with the assertion that Rolls Royces compete, not with Volkswagens, but with swimming pools or a summer home, and breakfast cereals compete with bacon and eggs. With such a concept of competition the benefits of antitrust laws are obviously small relative to the costs even without any imports. The flaw in this line of reasoning was recognized by Circuit Judge William Howard Taft in his appeals court opinion in 1898 in the Addyston Pipe and Steel case (85 Fed. 271). The fact that the midwestern pipe manufacturers, after cartelizing their market and raising their prices, faced competition from eastern competitors was not accepted as justification for acquittal. Taft understood that a portion of the price charged was the result of the collusive agreement, that enhancement of price was not prevented by the new competition it engendered. Whether it be from swimming pools, ham and eggs, or Japanese steel and automobiles, all monopolizers will face increased competition until one conglomerate controls the whole world economy. The nature of the problem hasn't changed since 1898.

The third point is that large conglomerate firms, far from constituting a threat to competition, actually serve a pro-competitive function as potential entrants into any market in which monopoly rents emerge except those with natural monopoly. Thurow presents no evidence that barriers to entry are nonexistent and, in fact, contradicts his own earlier assertion (Thurow, 1975: 147) that "barriers to entry are often high, and managers often do not have the specialized knowledge necessary to make profits in another industry." Furthermore, conglomerates usually make entry by acquisition, not by adding new capacity to an industry.

The fourth point is that nothing of economic value is achieved by government victories in antitrust cases. Here the argument shifts to the position that antitrust cases have made only superficial changes in the structures of such industries as oil, aluminum, steel, and autos, and that little improvement would come from breaking

IBM up into three or four firms. Thurow sees the computer industry as more competitive than the others even without a government antitrust victory and in spite of IBM's dominance. While antitrust has been inadequate, it does not follow, however, that without the law competition would have been maintained as well as it has been. The deterrent effect of the law—particularly, of private treble damage suits—cannot be ignored. Even the long lasting government IBM case may not have been a waste of resources. While such a case is pending, business practices are undoubtedly affected. Removal of the inhibited effects of the U.S. antitrust laws could produce rapid and radical changes in both the structure and conduct of American business in world markets as well as in the domestic economy.

The fifth point is that the antitrust laws view competition narrowly as price competition only. Thurow says (1980: 149):

> To look simply at the degree of price competition in the economy is to grossly underestimate the degree of real competition in the economy. When industries do not engage in price competition, there usually is a perfectly good reason (other than monopoly) as to why they do not. It simply isn't the most efficient way to compete. As a result, we are not going to restore price competition and puritan simplicity through the antitrust laws.

Not only are the entry barrier effects of advertising ignored, but also the fact that shielding firms from price competition often shields them from non-price competition. If antitrust law is too narrowly focused on price competition, the remedy should be not in its repeal, but in broadening its scope. Non-price competition has its counterpoint in non-price restraint of trade. An illustration is found in the ability of the electric lamp cartel in the interwar period not only to enhance prices but also to standardize and reduce the quality of light bulbs and restrict quality competition in advertising, as evidenced by internal company documents revealed by antitrust proceedings (Stocking and Watkins, 1946: 353–355; Board of Trade, 1976: Vol. I, 51–55; Martin, 1962).

During those years in the fifties and sixties when the Volkswagen "beetle" was breaking into the U.S. automobile market, U.S. companies found "the most efficient way to compete" to be the annual model change, advertising of style, gas guzzling power, and deteriorating bumpers, rather than price. Antitrust clearly failed to keep the industry competitive enough domestically to forestall entry from abroad. Non-price competition was not enough.

This discussion reveals a broader position held by conservative and liberal advocates of industrial policy on the crucial question of what constitutes adequate or workable competition. Implicitly, they argue that (1) monopolization always engenders competition in a broader market, (2) the big conglomerates will enter any market in which monopoly power exists and operate in that market competitively, (3) antitrust remedies are ineffective in making significant changes and have no deterrent effect, and (4) price fixing and price leadership do no harm because firms behave competitively with respect to all non-price decision variables and such non-price competition is adequate to achieve the benefits of competition.

With these concepts of competition in mind, the primary point—that in markets where international trade exists, national antitrust laws no longer make sense—can be evaluated. Here, the argument is a legitimate one about the obsolescence of antitrust law. Imports have increased and Thurow advocates continuation of a free trade policy. The question, however, is not merely whether import competition is an adequate substitute for antitrust laws but also whether import competition will remain competition if U.S. and foreign multinational corporations are freed from the constraints of U.S. antitrust laws. Thurow only hints at the possibility of a world market restraint of trade or a monopoly problem, but dismisses the question by concluding that since nothing could be done about it, we should ignore it. All he has to say on this crucial point is (1980: 146):

> One could debate whether international antitrust laws would make sense, but this debate would be completely irrelevant from a practical perspective. In the absence of anything resembling world government, and in the presence of widely differing views on the usefulness of antitrust legislation, no enforceable, international antitrust laws are going to come into existence.

In spite of this pessimism about international antitrust laws, Thurow is very optimistic about the efficacy of import competition. He makes his argument by reference to the automobile and steel industries. He says that General Motors' domestic market share is irrelevant to judging competition in the U.S. automobile industry because G.M. "must deal with strong Japanese and European competitors." Any good effects on the U.S. auto and steel industries from antitrust enforcement are minor compared with the actual and potential good effects of Japanese and European imports. Yet, absent antitrust, one way G.M. can deal with the Japanese rival is by joint venture rather than by competition.

Must we choose between international competition and domestic competition? Are all "real barriers" to international trade governmental arrangements such as the trigger price system in steel? If the United States abandoned antitrust but stopped government-imposed restraints on trade, would the result be competition or would it be international cartels and joint ventures allocating world markets including the U.S. market? The answer to these questions are not clear and thus cannot be read as an argument to abandon antitrust.

One other argument must be considered. Thurow says (1980: 146): "If they [the U.S. antitrust laws] do anything, they only serve to hinder U.S. competitors who must live by a code that their foreign competitors can ignore." He cites no evidence at all to support this very old claim. U.S. firms are generally bigger than foreign competitors and prohibition of participation in international cartels is the chief restraint imposed by U.S. antitrust laws on U.S. firms' behavior in foreign markets. Furthermore, Thurow neglects the fact that U.S. antitrust laws apply to all firms operating in American markets whether they be U.S. or foreign-based and U.S. firms along with foreign firms are subject to the antitrust laws of other countries and the European Communities. Prohibition of participa-

tion in international cartels does not reduce an American firm's ability to compete. Indeed, firms outside a cartel have better sales and profits than those within. Antitrust, albeit, inadequately, serves to inhibit the substitution of private negotiation for competition.

Reconsidering the Industrial Policy—Antitrust Interface

Antitrust policy and trade policy are closely linked. Both policies deal with restrictive practices and barriers to competition. The problem of the "competitiveness" of U.S. industry has to do with the ability of U.S. production, without restrictive practices, to compete with imports from other countries as well as the ability of U.S. exports to compete in the markets of the rest of the world. Both the import and the export aspects of the problem present antitrust policy issues. U.S. antitrust law cannot reach all foreign restrictive business practices nor can our antitrust law alone cope with either domestic or foreign governmental restraints on competition. (Nonetheless, just as every nation can gain if all move toward freer trade, every nation can gain if all move toward stronger antitrust policies.)

Jurisdictional Limitations

On its face, the Sherman Act applies to "every combination" and "any person" that restrains or monopolizes trade between foreign nations and the United States. No distinction is made in the statute between U.S. and foreign corporations. Yet the application of U.S. antitrust law to activities that take place outside the country gives rise to questions of jurisdiction. Policies of the Department of Justice and the U.S. courts on these jurisdictional questions are discussed in the "Antitrust Guide for International Operations" released by the Antitrust Division in 1977 and considered to reflect current policy in 1983. Acts of U.S. citizens in a foreign country are normally subject to the law of that country, but when such acts have a substantial and foreseeable effect on U.S. markets they are subject to U.S. law. Over the years the personal jurisdiction of U.S. courts has been expanded to reach citizens or foreign persons who transact business within the court's jurisdiction whether or not they are "found" there in the traditional sense. The stated policy (*"Antitrust Guide,"* 1977: 8) is to: "utilize these principles to seek to exercise the fullest permissible jurisdiction over those who illegally cartelize our markets." The doctrine of sovereign immunity, however, provides a defense to personal jurisdiction. U.S. policy attempts to limit such immunity to conduct of a sovereign acting qua sovereign and not in a proprietary capacity. The Justice Department says (*"Antitrust Guide,"* 1977: 9): "In general, foreign firms, including state-owned or controlled firms, will be expected to observe the prohibitions of our antitrust laws, and to benefit from the enforcement of those laws in the same manner as domestically incorporated enterprises."

In spite of the stated policy, activities in foreign countries may affect U.S. markets, be of such a nature that if done here they would be unlawful, and still not be reachable by U.S. antitrust law. The recent Houdaille petition provides an interesting illustration of

such foreign cartelization in the Japanese machine tool industry. The Houdaille petition to the United States Trade Representative's Office sought invocation of Section 103(D) of the Revenue Act of 1971 to deny investment tax credit on purchases of Japanese machine tools (*"Wall Street Journal,"* 1982: 20). The petition by an American firm competing in U.S. markets with Japanese imports sought redress on the grounds that: in 1956 the law was enacted authorizing the Ministry of Industry and Trade to instruct company executives on how to comply with a basic plan for restructuring major industries and the metal cutting machine tool industry was designated by the Cabinet as an industry to be reshaped; in 1960 MITI and the industry reached agreement exempting machine tool companies from Japanese antitrust laws, provided they complied with MITI guidelines, thus allowing joint control on size of companies and production quotas; in 1968 MITI ordered each company to drop any product line in which its industry share was less than 5 per cent or less than 20 per cent of the company's production; in 1971 MITI ordered the companies to increase the share of high-technology, numerically controlled machine tools to half of industry output and exhorted the industry to promote joint operations with respect to technology, production, materials, and marketing including export sales; in 1978 the Machine Tool Export Association endorsed a cartel agreement on prices of exports to the United States and Canada and a Cabinet order forced compliance on non-members of the cartel.

Even though the structure of control of the Japanese machine tool industry has effects on U.S. imports and exports, that structure is essentially beyond the reach of U.S. antitrust law. If the government-promoted cartelization were serving to restrict exports to the United States, a case might technically be possible, but domestic pressures for government intervention are more likely when the cartelization is serving to reduce price and enhance imports into U.S. markets. If the cartelization is serving to bar entry of U.S. exports into foreign markets, again a case might technically be brought if the defendants are found to do business in the United States, but the practical problems of investigation and discovery of the necessary evidence are immense in the face of an uncooperative foreign government.

The Reagan Administration, on April 22, 1983, denied the relief requested by Houdaille Industries but announced its intention of conferring with the Japanese on the issue of such industrial policies that target specific industries. An issue that might have been resolved by antitrust laws uniformly applied across national boundaries thus became a matter of trade negotiations. No adequate body of international law exists, but U.S. policy might be focused on bringing about harmonization of national antitrust laws.

In addition to attempting to prevent or remedy private restrictive practices that limit competition from imports into U.S. markets, our antitrust law also seeks to prevent or remedy privately imposed restrictions on the export of goods, services, or capital from the United States. Particularly, this aspect of enforcement policy is aimed at collective efforts by one group of exporters to exclude another firm from some export market. Both the Webb-Pomerene Act and the newly enacted Export Trading Company Act

contain provisos designed to continue the Sherman Act policy against both cartelization of the import markets or restriction of export opportunities. Thus both statutes are, in principle, consistent with the Sherman Act policy of promoting competition in foreign trade.

The U.S. antitrust laws do not reach all of the activities of either U.S.-based or foreign multinational corporations. The Antitrust Division statement of policy points out that extension of the Sherman Act to combinations with no direct or intended effect on U.S. consumers or export opportunities would encroach on the sovereignty of foreign states without any justification based on U.S. interests. Trade restraints beyond U.S. reach should be redressed by other nations' antitrust law. The United States, however, is a party to the 1976 Code of Conduct for Multinational Enterprises adopted by the OECD Council of the Committee on International Investment and Multinational Enterprises. In addition, the United States is committed to cooperation with foreign antitrust agencies. Thus a basis exists from which to embark on a policy of promoting harmonization of our trading partners' antitrust laws as well as development of a body of international common law. National promotional industrial policies themselves could be brought under such a law of fair competition. Free trade would perhaps be more easily achieved within such an international legal framework.

Governmental Restraints on Competition

Antitrust policy is often superseded by other policies both in the United States and abroad. In its attempt to hold on to the free trade principles embodied in GATT, the industrialized countries, including the United States have resorted to voluntary export restraint arrangements. Because VRAs are limited in scope and duration, they are viewed as better than permanent trade barriers. Because they are negotiated among governments they are considered less offensive to free trade than unilaterally imposed quotas. Yet VRAs are seldom temporary and never truly voluntary. Without doubt they are restraints on trade among nations and clearly inconsistent with the U.S. antitrust policy objectives. Not only is competition from the foreign country's exports reduced in the aggregate, but competition among the otherwise competing exporting companies has to be eliminated. Whenever the U.S. government induces the Japanese government voluntarily to restrain automobile or steel exports to the United States, the Japanese government must in some manner allocate the quota among the exporting companies. These arrangements force the Japanese to depart from the policy of competition we attempted to instill in them under the occupation while at the same time flying in the face of U.S. antitrust policy. Indeed, a lower court once decided that the Secretary of State was included in the "any person" language of the Sherman Act and thus violated the law by negotiating the 1971 renewal of the Japanese steel VRA (*Consumers Union* v. *Rogers*, 1973).

Dumping is a real phenomenon. In an industry with high transport costs relative to the value of output, geographical price discrimination seems unavoidable. The basing-point system is a system of "limited dumping" (Stegeman, 1968: 407). Each producer

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is free to meet, but not undercut, the delivered price of his rivals by absorbing freight costs. Only by lowering his list price can he be undercut. This system allows considerable trade and some competition in the European Coal and Steel Community as well as among the several states of the United States. A second best solution to the extremely difficult problem of getting from where we are to a workably competitive world steel industry might be found in the extension of the basing-point systems of Europe and the United States to the whole of world trade in steel. Such an extension would require not only changes in a number of U.S. statutes, including antitrust, but negotiation of a treaty to create a World Steel Community open to all nations. Safeguards against too much damage to the public interest might be achieved by the grant of powers to a high authority similar to those given the Commission of the European Communities by the Treaty of Paris.

A limited supranational governmental mechanism with antitrust provisions was created by that treaty in 1951 and extended by the admission of additional nations to the European Communities. Article 65 in the European Coal and Steel Community treaty concerned concerted practices and agreements. Article 66 deals with a dominant position by one or more firms. These provisions have served to give the Commission of the European Communities some power to enforce a competition policy at least for commerce within and among the member states.

Unlike the Treaty of Rome, however, the Treaty of Paris provided for the abandonment of the competition policy in times of "crisis" in the steel industry. Indeed the treaty can be viewed as having recreated and legally sanctioned cartelization very much like that of the prewar period. The competition promoting aspects of the ECSC prevailed from its inception until the recession of 1974. From that time on the "temporary" crisis measures have dominated. Industrial policy has replaced competition policy for the European steel industry. Not only has the supranational organization set minimum prices and output quotas, but it has negotiated "voluntary" restraint arrangements to limit imports into Europe from third countries. The Commission has also adopted industrial policy measures to accomplish "rationalization" and a phasing down of steel capacity while at the same time attempting to sustain profitability. Interestingly, even though many of the European steel enterprises are nationalized, the powers delegated to the ECSC constrain governmental as well as private decision makers. The European steel experience constitutes not only an example of the conflict between competition policy and industrial policy, but also an example of coordination of national industrial policies.

Possible Changes in U.S. Antitrust Policy

The question remains whether the United States should at this time of economic crisis make changes short of outright abandonment of antitrust law. The pressures to abandon the policy of competition are part and parcel of the pressures to abandon free trade. Indeed, a free trade policy could not be sustained, nor would it have much relevance, if we gave legal sanction to corporate arrangements to negotiate the allocation of the world's markets. Sev-

eral changes might be made in U.S. antitrust policy without throwing it out completely. Yet, like protectionist measures, any relaxation is a foot in the door for others. The Export Trading Company Act of 1982 has already made several changes that may prove to be very significant. Let us consider that new legislation before turning to other proposals not yet enacted.

The Export Trading Company Act

Because a large portion of Japanese exports are handled by export company intermediaries with obvious success, advocates of public policies to encourage U.S. exports have long advocated modification of the Webb-Pomerene Act and other measures to encourage U.S.-based export trading companies. Title I of the 1982 legislation directs the Secretary of Commerce to establish an office to promote the formation of export trade associations. Before the bill went into effect there were already more than 2,000 export distributors serving 10,000 American producers but only a very small number are Webb-Pomerene Associations (Abbott, 1982: 43). The new office will provide information and facilitate contact between producers of exportable goods and services and firms offering export trade services. Title II amends the Bank Holding Company Act of 1956 to allow bank holding companies to establish and hold equity interests in export trading companies either as sole owners or as a joint venture with nonbanking firms subject to a limitation on the size of the equity holding relative to the bank's capital and surplus. Title III provides for the issuance of "export trade certificates of review" by the Secretary of Commerce with the concurrence of the Attorney General, which are intended to provided some protection from antitrust prosecution for conduct authorized in advance by the certificate. Not only export trading companies affiliated with banks, and other export trading companies, but "any person" can apply for a certificate for conduct related to export trade. Title IV amends the Sherman Act and Section 5 of the FTC Act to change the burden of proof for suits brought against conduct not covered by a certificate of review. Essentially this provision codifies the policy used by the Antitrust Division of limiting its actions to export-related conduct that has a "direct, substantial, and reasonably foreseeable" adverse effect domestically.

The new functions of the Secretary of Commerce are a step in the direction of giving that department powers comparable to the Japanese Ministry of Trade and Industry. Yet the powers granted by Congress in the Export Trading Company Act are diffused and circumscribed. The Federal Reserve Board plays a role in permitting or prohibiting banks from participating in export trading company ventures. The statute's stated purpose is to encourage bank participation in trading companies, but it gives the Board power to disapprove not only on grounds that participation might adversely affect the safety and soundness of a subsidiary bank, but also if "disapproval is necessary to prevent unsafe or unsound banking practices, undue concentration of resources, decreased or unfair competition, or conflicts of interest." This power in the hands of the Fed could potentially limit the success of the Commerce De-

partment in promoting Japanese-type-bank-related export trading companies.

The Japanese MITI can grant immunity from Japanese antitrust laws. The Secretary of Commerce has been given some, but quite limited, powers to grant U.S. exporters a "safe harbor" from antitrust risks. The certificate of review procedure not only requires the concurrence of the Attorney General, but the protection offered by the Certificate is limited by statutory standards not unlike the Webb-Pomerene Act and the Antitrust Division's stated enforcement policies—that is, the certificate is supposed to sanction only methods of operation that result in no restraint of domestic trade nor the export trade of a competitor. In one way the statutory standard is stronger than pre-existing law. The certificate shall be issued only if the proposed activities do "not constitute unfair methods of competition against competitors." Because the Export Trading Company Act provides some, albeit limited, procedures for private suits and because such suits have never been authorized for Section 5 FTC Act offenses, antitrust risk is increased to some extent. "Unfair methods of competition" is a legal category that can include practices not normally considered to be in restraint of trade.

The probable effect of this statute will be to discourage private antitrust suits alleging violations in export trade and thus giving the two Cabinet officers joint administrative power to grant protection from antitrust risks. Much will depend on the policies adopted by the Secretary and the Attorney General and they will have much discretion to bargain with business managers in the manner of MITI. Even if they should choose to interpret the statutory standards as a court would in an antitrust case, they will not be acting within the context of an adversary proceeding.

The antitrust law process has thus been replaced by an administrative process. Exposure of exporting firms to the uncertainties arising from future actions by antitrust enforcement agencies, the many potential private plaintiffs, and the many juries and courts has been replaced by uncertainty about the decisions of the Secretary of Commerce and the Attorney General. Whether U.S. firms are unshackled from U.S. policy against the cartelization of domestic markets and exclusion of exporting competitors from foreign markets will depend on the manner in which future Secretaries of Commerce and Attorneys General choose to apply the statutory standards in granting certificates of review.

Title IV was tacked on to the Export Trading Company Act in conference without ever having passed the Senate. It stemmed from Congressman Rodino's Foreign Trade Antitrust Improvements bill that was designed to counter the common perception of businessmen that antitrust laws made export trading risky. Its essential purpose was to write into the Sherman Act and Federal Trade Commission Act the "direct, substantial, and reasonably foreseeable effect" language used in the Antitrust Division's guidelines. It prevents a private plaintiff or the Federal Trade Commission from prevailing in an action inconsistent with Antitrust Division policy. Title IV should lessen the uncertainty of antitrust action against conduct not covered by a certificate of review.

These changes in U.S. antitrust policy will probably have little effect on the ability of U.S. companies to compete in U.S. markets with imports from those foreign producers not comparably constrained by either U.S. or foreign antitrust laws. A change in U.S. antitrust law that accomplished that objective might well be viewed as a protectionist measure designed to reduce imports and reserve a larger portion of U.S. markets for U.S. production. A policy of competition and free trade is consistent with measures to reduce imports however, if imports have been increased by "unfair competition." Industrial policies of other nations, including promotion of cost reducing collaboration in research without fear of treble damage claims might well be viewed as an unfair advantage. To lessen such advantages, the United States might seek changes in the industrial policies of other nations to make them more like our own or we might adopt policies modeled after those of our trading partners.

Joint Ventures in Research and Development

One specific example of the latter approach would be the adoption of some sort of new legislation on joint research ventures. Secretary of Commerce Baldrige, among others, has recently proposed relaxation of the antitrust laws and has also put into effect a program to encourage Industrial Technology Partnerships. These limited partnerships will act as arms-length contractors between researchers and end-users, thus minimizing antitrust risk while taking advantage of tax incentives to raise venture capital. Baldrige would like to see, in addition, changes in antitrust laws. In spite of Assistant Attorney General Baxter's opinions that "antitrust risk" is largely an excuse used to avoid sharing information, he too would be willing to support legislation to reduce business uncertainty, and in May 1983, he issued new guidelines to accomplish that objective ("New York Times," 1983). Several bills were introduced in the last Congress that would give the Department of Justice authority to issue certificates of review removing specified plans for joint operations from both criminal prosecution and treble damage suits. A similar bill was recently introduced by Senators Mathias and Hart.

Clearly, both the Sherman Act and Section 7 of the Clayton Act provide a basis for examining the legality of any joint venture, including joint research ventures, but the statutory standards require a finding of unreasonable restraint of trade or a substantial lessening of competition. In 1974 Assistant Attorney General Kauper said that the Antitrust Division had "not challenged in court agreements purely for joint research, although it has investigated some" (Kauper, 1975: 63 and Ginsburg, 1979). During 1978 and 1979 a White House Domestic Policy Review of Industrial Innovation led to the conclusion that antitrust spurs competition and competition spurs innovation, but because of the common perception that antitrust inhibits desirable collaboration, President Carter directed the Department of Justice to clarify its position on collaboration in research so that the antitrust laws are not "mistakenly understood to prevent cooperative activity, even in circumstances where it would foster innovation without harming competition." In response, the

Antitrust Division issued guidelines ("Antitrust Guide," 1980). These guidelines set forth the principles underlying Antitrust Division policy, a number of hypothetical cases, and a summary of the 21 joint R&D venture business reviews and clearances from 1968 to 1980.

That guide saw antitrust issues arising because "joint research may involve or create market-dominating technology, may be conducted by competitors or potential competitors, or may involve restrictive agreements concerning the use of the results of the research ("Antitrust Guide," 1980: 1). Pure research ventures without ancillary restraints have never been challenged by the division and cases against restrictive conditions ancillary to joint R & D ventures have been rare. Ironically, it is the rarity of cases that presents the problem—uncertainty about the law. The 1980 and 1983 Antitrust guides attempt to clarify the law, at least from the standpoint of the Antitrust Division policy. Private suits may be brought and courts may interpret the law differently, however.

Competition is, indeed, a great spur to innovation and innovation intensifies competition. A policy that tolerated restraint of trade in the name of innovation would be self-defeating in the long run, particularly if it tolerated restraints of trade on a world-wide scale. If American technological leadership resulted from our competitive structure, and this competitive structure from our antitrust policy, we should not lightly abandon antitrust just to match the policies of other nations.

The intimate connection between control of technology and control of markets requires that we take care to reduce uncertainty in ways that do not permit cartelization and market dominance. One approach might be to federally charter joint research venture corporations and provide for adequate (1) representation of the public on boards of directors, (2) disclosure of all activities and arrangements that might lessen competition in any market, and (3) participation of outsiders in the fruits of research. Comsat is an example that might be adapted. If private antitrust suits are to be eliminated, then it seems essential that some alternative mechanism be found to protect the public from unlawful restraints and monopolies. The private suit mechanism is not merely a device for protecting injured parties but the most powerful deterrent to violation of the law.

Harmonization and Coordination

Perhaps the time has come to reopen the questions raised at the Havana Conference and again seriously consider the establishment of an International Trade Organization. Coordination and Harmonization not only of national antitrust laws but of all aspects of national industrial policies might be achieved with much less risk of economic warfare and the breakdown of world trade. The large and growing portion of world trade arising in the planned sectors makes national antitrust laws insufficient even if harmonized. Such an international organization should not merely lessen the growing tensions among the OECD nations, but also facilitate orderly East-West trade relations and protect the aspirations of the developing nations. The desire of other nations to have and retain

access to our market should give the United States considerable bargaining power at the conference table.

Conclusions

This analysis suggests that a well-thought-out set of industrial policies for the United States can and should include positive action to make markets competitive. Vigorous domestic U.S. antitrust policy, U.S. actions to achieve changes in other nations' restrictive practices laws, and development of new multilateral mechanisms to assure fair competition in world markets are all urgently needed.

Antitrust is central to a viable industrial policy of rapid adjustment. Only competition can discipline concentrated powerful industries and weaken politically imposed rigidities that stem from the process of adjustment to new foreign competition and which governments often provide at the request of the industry itself. Furthermore, antitrust provides the missing link between policies in the market sector designed to help business help itself and policies in the "planned" sector where market forces are intentionally suppressed.

Most important, new ground rules are needed for competition among the "planned sectors" of several national states. Otherwise, countries with the least bargaining power—the developing countries—will be barred from competing against the business-government alliances in the powerful countries. In a world of such collusion, governments are likely to become the instruments of the special corporate interests and not even succeed in adequately representing the parochial interests of each nation.

Industrial policy, by its very nature, has to do with competition of the people of each country with the people of other countries for economic advantages. If each country's industrial policy actions are not to become moves in a negative-sum, multinational game, the U.S. should again assert its power in the world to create a legal framework in which national rivalries can take place with benefits for all the world.

Appendix

The purpose of U.S. antitrust laws has been to promote competition and maintain open markets by curbing the power of dominant firms or groups of firms acting collusively. The purpose has also been to promote international competition because collusive behavior of firms at the international level restricts international trade and therefore competition, with adverse affects on prices, price-cost margins, and efficiency. Competition among American companies for foreign markets as well as competition of all firms for U.S. markets has been the goal of the law.

Post-World War II U.S. antitrust policy was part of a general policy aimed at preventing the return to the economic nationalism of the interwar period. National struggles for access to markets for resources and manufactured goods were underway in the aftermath of the Versailles treaty. Even before the Great Depression and collapse of world trade, economic rivalry among the developed nations was characterized by cartelization in many industries with government encouragement in many countries. Typically the home markets of each developed country were reserved for domestic enterprises to allocate among themselves and "third country" markets—i.e., the less developed world—were divided up as exclusive territories for cartel participants. Cartelization was a system of neocolonialism in which the "mother country" as well as the colonial roles were negotiated industry by industry. Periodically the agreements would expire or collapse and intense competition would ensue as cartel participants strove to increase market shares, which were likely to

be used as the basis of the next agreement (see Epstein and Newfarmer's 1980 study of the electrical equipment industry). The depression put stress on cartel agreements but also increased the incentives for collusion. National governments other than the U.S. generally encouraged such private negotiation of world market shares and protection of home markets.

During World War II the U.S. Senate authorized a study of "the possibilities of better mobilizing the national resources of the United States." In connection with that investigation, the Subcommittee on War Mobilization of the Senate Committee on Military Affairs subpoenaed from the files of the Antitrust Division some of the materials "bearing on the activities of cartels and monopolies, particularly in relation to practices hampering the full development of technology." In his preface to the monograph *(Economic and Political Aspects of International Cartels,* 1944: vi), Subcommittee Chairman Harley M. Kilgore said:

> The study points out a number of instances where cartels and monopolies, before the war, hindered the full development of technology in the United States and jeopardized our preparedness for national defense. . . .
> The findings of this study suggest the need for substituting for monopoly and cartel activities, private and public approaches which would insure the maximum development technology in the interest of full production and national security. The study points up the necessity for developing a foreign economic program that will both preserve the integrity of our domestic economy and enable us to maintain friendly economic and political relations abroad. Such a program along new lines is requisite if we are to establish an enduring peace after the war.

Corwin Edwards also drew upon the antitrust files in a wider ranging article "International Cartels as Obstacles to International Trade." Although many details were not disclosed in either published document, the Antitrust Division seems to have compiled a list of 179 cartels, 109 of which included American firms. The 179 total included 133 in manufactured and semimanufactured goods, 32 in minerals and 14 in agricultural products and services. Edwards pointed out that the prewar cartels were private arrangements restricting international trade.

At the end of World War II antitrust moved to center stage as industrial policy, most notably in the United States. The United States continued and strengthened its traditional prohibitions against restraint of trade and monopolization. In 1945 the Sherman Act was revitalized by the Alcoa case (148F. 2d 416) and in 1950 Congress enacted the Celler-Kefauver amendment to Section 7 of the Clayton Act. As early as 1943 an inter-agency task force under the leadership of the State Department has been investigating cartel and other trade barriers. The American initiative stimulated governmental studies of cartels in the United Kingdom and Canada (Gribbin: 1976). The allied planning for the postwar world trading system was well informed about the restrictive effects of the prewar cartels and on the need for both national and international law on restrictive business practices. Out of that wartime planning came much invigorated domestic competition policies in many of the western developed nations, including the occupation policies imposed on Japan and Germany (Hadley, 1970: 3–19).

The close connection between antitrust policies and free trade policies was embedded in the treaties that established the European Communities. Removal of government-imposed barriers to international trade among the member nations would have accomplished little expansion of trade if private restrictive agreements and market dominance had been permitted as in the prewar period. Thus both the Treaty of Paris and the Treaty of Rome contained strong antitrust provisions modeled on United States antitrust law (Martin, 1979).

Immediately after the war, the United States set in motion international consultations that culminated in an agreement in 1948 by delegates from 56 countries on the draft of what came to be known as the Havana Charter for the International Trade Organization (Wilcox, 1949: 49). In 1945 the State Department had issued a document, "Proposals for Expansion of World Trade and Employment," that proposed the ITO and guidelines for reducing: "(1) restrictions imposed by governments; (2) restrictions imposed by private combines and cartels; (3) fear of disorder in the markets for certain primary commodities, and (4) irregularity, and fear of irregularity, in production and employment" (*New Horizons in World Trade,* 1946: 3; and Potter, 1946: 1).

By the fall of 1947 an American inspired draft for the Havana Charter was well known and there was reason to be optimistic that the forthcoming Havana Conference would be able to reach agreement. A month before the Havana meeting began, representatives of 23 countries met in Geneva and reached a general agreement on

tariffs and trade, expecting that the ITO would soon be created and that subsequent trade negotiations would be conducted under its auspices as part of item (1) in the guidelines—reducing restrictions imposed by governments. Failure of the United States to ratify the Havana Charter resulted in the 1947 Geneva agreement becoming a *de facto* international organization, but a far less comprehensive organization than the ITO would have been. The proposed International Trade Organization might have been a mechanism for preventing escalation of economic warfare through industrial policies, just as the International Monetary Fund served to inhibit unilateral competitive devaluation of currencies to enhance ones balance of trade and export unemployment.[1]

Indeed, the ITO would have been a supranational governmental organization. The restrictive business practices provision would have been applicable to commercial activities of government controlled enterprises as well as to privately owned corporations. The ITO, far more than GATT alone, might have been a basis for development of rules of the game within which to contain national economic rivalries. The reaction to this pro-competitive postwar development set in, however, even before it was put into effect. Like the League of Nations proposal, the Havana Charter failed to be ratified by the country that did the most to bring forth the idea (Diebold: 1962).

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[1] Writing about the Havana proposal (1949: 112–113), Clair Wilcox said:

"The principle of competition in international markets is given formal rejection. A common policy toward monopoly is established. Major commitments to action are taken. A forum is set up where restrictive business practices can be questioned and condemned. An instrument is fashioned through which corrective measures can be devised. A process of education is set in motion. A method is provided for accumulating a body of knowledge and experience. A foundation is laid for a structure of international common law to govern business practices in foreign trade."

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